

March 15, 1989

To: Custodian WHC-CM-7-7, ENVIRONMENTAL  
INVESTIGATIONS AND SITE CHARACTERIZATION MANUAL

DOCUMENT PROJECTIONS


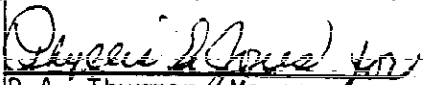
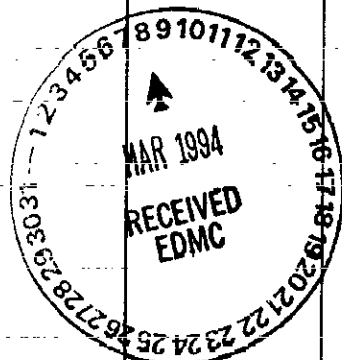
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<div style="display: flex; justify-content: space-between;"> <div>   E.M. Schroeder, Manager  Management Standards </div> <div> <u>2-28-89</u>  Date </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>   P.A. Thurman, Manager  Document Control </div> <div> <u>3-01-89</u>  Date </div> </div>				
				

I have personally received the revisions identified for release in this package and assume full responsibility for updating my manual in accordance with instructions.

Custodian

Date

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Effective Date

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Organization Environmental Engineering  
and Technology

TITLE

Approved by:

INDOCTRINATION, TRAINING AND  
QUALIFICATION

*L.C. Brown* 2/27/89  
L.C. Brown, Manager

Environmental Engineering & Technology

## 1.0 PURPOSE

This Environmental Investigation Instruction (EII) establishes training requirements and indoctrination and qualification methods for the Westinghouse Hanford Company (WHC) Environmental Engineering and Technology (EE&T) Function.

## 2.0 SCOPE

This instruction applies to EE&T technical and professional personnel to assure that job proficiency is achieved and maintained.

## 3.0 DEFINITIONS

Indoctrination -- Instruction for understanding of principles and technical objectives. May be oral presentation or assigned reading of specific documents.

Qualification -- The characteristics or abilities gained through education, training, or experience that qualify an individual to perform a required function.

## 4.0 RESPONSIBILITIES

### 4.1 GROUP MANAGERS

Environmental Engineering and Technology Group Managers are responsible for ensuring that:

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**INDOCTRINATION, TRAINING AND QUALIFICATION**

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1. The Employee Training Matrix (provided by Technical Training) identifying WHC formal training courses for each employee is completed and returned to WHC Technical Training for documentation, tracking and record purposes.
2. Personnel attend formal training courses identified by the Employee Training Matrix.
3. Personnel are qualified to perform assigned activities.
4. Personnel receive indoctrination commensurate with the scope, complexity and nature of the activity based on individual proficiency.
5. Personnel action plans as they relate to training and development are fulfilled.
6. Indoctrination, training and qualification documentation is maintained as required (auditable records of section 5.1 training are maintained by WHC Technical Training).

**5.0 REQUIREMENTS**

**5.1 FORMAL TRAINING**

Formal Training may be presented by various organizations e.g., Quality Assurance, Safety, Technical Training and others. Formal training is based on approved lesson plans and presented by a recognized qualified instructor as required by internal WHC training requirements. The WHC Technical Training Organization maintains auditable records of formal training.

Minimum mandatory formal training for EE&T personnel assigned to potentially hazardous (including mixed waste sites) field activities are:

<u>Course Title</u>	<u>Course No.</u>
● Hazardous Waste Site 40 HR - Vendor	100012
or Hazardous Waste Site 24 HR - Vendor	100011
Plus: 24 hours field orientation accompanied by an employee having completed one of the above courses and 24 hours of field orientation.	
● SCOTT 4.5 SCBA	20030
● SCOTT "SKA-PAK" Training - SKA	20032



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**Course Title**

**Course No.**

- HAZCOM Orientation

2006B

- Radiation Worker Safety

20001

**5.2 INDOCTRINATION**

Environmental Engineering and Technology personnel shall be indoctrinated in part or all of the following areas as specified by the group manager as they relate to the individuals job assignment:

- Work Plans
- Safety requirements/environmental hazards. Emergency actions, including immediate corrective action and notification required
- Sample plans and protocol
- Regulatory guidance documents
- Environmental Investigation Instructions
- Company policy and procedures
- Quality Assurance program elements
- Site specific documents
- Job responsibilities and authority
- Desk instructions.

**6.0 PROCEDURE**

**6.1 FORMAL TRAINING**

Group managers shall identify the need for training and/or indoctrination to:

- Achieve initial proficiency

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- Maintain proficiency
- Adapt to changes in technology, methods or job responsibilities.

The Catalog of Courses maintained by WHC Training Records Administration may be used to identify formal training. Formal training needed but not yet developed may be identified to WHC Technical Training by a Training Request Form in accordance with internal WHC requirements.

Group managers shall identify mandatory and recommended formal training for each employee on the Employee Training Matrix and submit to WHC Technical Training.

## 6.2 INDOCTRINATION

Indoctrination of EE&T personnel shall provide understanding of the principles and technical objectives in the areas selected by the Group manager in section 5.2 based on the scope and complexity of the activity and employee proficiency.

Group managers shall determine the need for and the method (oral presentation or assigned reading) of indoctrination.

### 6.2.1 Oral Presentations

The Group manager shall assign a subject matter expert to prepare oral presentations.

A presentation plan shall be developed by the subject matter expert and shall include the following components:

- Documents used as a basis for the presentation
- Topics, subjects or activities to be covered
- Objectives (what attendee is expected to know and be able to do following the presentation)
- Audience (i.e., sampling personnel, personnel responsible for logging activities, etc.)
- Length of presentation
- Visual aids and handouts to be used
- Dated signature of the subject matter expert (Preparer) and the Group Manager.

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Presentation plans shall be approved by the assigning group manager. The presentation plan shall contain sufficient detail to facilitate consistent indoctrination when presented by an individual as qualified as the assigned subject matter expert.

The presenter shall ensure that personnel attendance is documented on the Indoctrination Attendance Form, Figure 1. The presenter shall forward a copy of the completed Indoctrination Attendance Form to each group manager with personnel attending the presentation. The Group manager shall place a copy of the form in each attendees personnel file (training section).

### 6.2.2 Assigned Reading

The Group manager shall determine and assign the reading by identifying the documents on the Assigned Reading Form, Figure 2, for personnel requiring this type of indoctrination.

The Assigned Reading form is completed by the employee and returned to the group manager. The Assigned Reading form completed by the employee shall be retained by the Group manager for placement in personnel files (training section).

## 6.3 QUALIFICATION

A degree in engineering or science or equivalent combination of education and experience is required for engineering and scientific positions. Examples of applicable degrees or experience include:

- Engineering (civil, environmental, geologic, chemical, nuclear, agricultural)
- Science (geology, biology, earth science, environmental science or related field)
- Quality assurance or training.

An Employee Fact Sheet or Resume identifying past job assignments, experience and educational background and signed and dated by the employee shall be provided to the Group manager.

A Certificate of Qualification shall be completed by the Group manager for each technical and professional employee. In some instances more than one form may be required for an employee; for example; Qualified as a Geologist and qualified as a Health and Safety Officer.

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Employee qualification shall be evaluated annually by the Group manager.  
Annual evaluations shall be documented on Figure 3 by the Group manager.

The Certificate of Qualification and documentation supporting the  
qualification are maintained by the Group manager.

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INDOCTRINATION ATTENDANCE FORM

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Presentation						Date Attended	
Document Reference(s) - Include Revision Numbers							
Instructor or Presenter Name		Instructor or Presenter Signature		Payroll #	Telephone	Building	Room Area
	LAST NAME	INITIALS	SIGNATURE	PAYROLL #	ORG CODE		
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18							
19							
						Total Attendees	
Comments:							

Figure 1. Indoctrination Attendance Form.

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ASSIGNED READING

Date

Employee: \_\_\_\_\_

Location: \_\_\_\_\_

Payroll#: \_\_\_\_\_ Org. #: \_\_\_\_\_

You are required to read the following document(s) and enter the appropriate completion information. Return completed form to the group manager at completion of assigned reading.

Document#

Rev#

Title

Date Reading  
Completed

The information I have entered above is legible, accurate, and complete.

\_\_\_\_\_  
(Employee Printed Name)

\_\_\_\_\_  
(Employee Signature)

\_\_\_\_\_  
(Date)

Figure 2. Assigned Reading Form.

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**INDOCTRINATION, TRAINING AND QUALIFICATION**

Westinghouse Hanford Company	CERTIFICATE OF QUALIFICATION				
<div style="text-align: center; margin-bottom: 20px;"> <hr style="width: 80%; margin: 0 auto;"/> <p>(Name)</p> <hr style="width: 80%; margin: 0 auto;"/> <p>(Payroll No.)</p> </div> <p style="text-align: center; margin: 20px 0;">IS HEREBY QUALIFIED AS</p> <div style="text-align: center; margin-bottom: 20px;"> <hr style="width: 80%; margin: 0 auto;"/> <p>(Position)</p> </div> <p>Basis Used for Qualification is (are) Checked Below:</p> <ul style="list-style-type: none"> <li>• Education <span style="float: right;">_____</span></li> <li>• Experience <span style="float: right;">_____</span></li> <li>• Indoctrination <span style="float: right;">_____</span></li> <li>• Training and subject specific seminars <span style="float: right;">_____</span></li> <li>• Supervised field experience <span style="float: right;">_____</span></li> <li>• Results of physical examination <span style="float: right;">_____</span></li> <li>• Results of periodic evaluation <span style="float: right;">_____</span></li> </ul> <div style="margin-top: 20px;"> <p>THIS QUALIFICATION IS VALID FOR _____ YEARS UNTIL _____</p> <div style="display: flex; justify-content: space-around; width: 100%;"> <span>(No.)</span> <span>(Date)</span> </div> </div> <div style="margin-top: 20px;"> <div style="display: flex; justify-content: space-between; width: 80%; margin: 0 auto;"> <span>_____</span> <span>_____</span> </div> <div style="display: flex; justify-content: space-between; width: 80%; margin: 0 auto;"> <span>(Signature of Certifier)</span> <span>(Date)</span> </div> <div style="margin-top: 10px;"> <span>_____</span>            (Title of Certifier)         </div> </div>					
PERIODIC EVALUATIONS PERFORMED BY:					
Name	Title	Date	Name	Title	Date

Figure 3. Certificate of Qualification.





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Organization Environmental Engineering  
and Technology

TITLE

Approved by:

NONRADIOACTIVE HAZARDOUS WASTE  
DISPOSAL

*E. C. Brown*  
E. C. Brown, Manager

Environmental Engineering & Technology

## 1.0 PURPOSE

The purpose of this document is to provide instructions for controlling accumulation and disposal of nonradioactive hazardous waste.

## 2.0 SCOPE

This instruction is applicable to nonradioactive hazardous waste generated and disposed of by the Environmental Engineering and Technology (EE&T) function of Westinghouse Hanford Company (WHC).

## 3.0 DEFINITIONS

Hazardous Waste -- Nonradioactive solid waste identified in the referenced regulations as requiring special handling, transporting and/or disposal methods and regulated as hazardous waste. Hazardous waste may include such wastes as paint, paint thinner, solvents, flammable liquids, poisons, corrosive liquids/solids, dilute acids and bases, and other hazardous chemicals.

Hazardous Waste Label -- Label used to identify the contents of a container as hazardous waste (Figure 1).

Hazard Class Labels -- Department of Transportation (DOT) labels (Figure 2) used to identify the chemical characteristics (i.e flammable liquid, flammable solid, poison, oxidizer, irritant, corrosive) of hazardous materials or wastes.

Uniform Hazardous Waste Manifest -- Environmental Protection Agency form (Figure 3) that must accompany each shipment of hazardous waste and be signed by individuals relinquishing and accepting custody of hazardous waste. Only certified Hazardous Waste Coordinators are permitted to sign Uniform Hazardous Waste Manifest.

Advance Waste Markings -- Identification required on waste containers stored in the hazardous waste storage area. Identification shall include, the accumulation date, the words, "Hazardous Waste" or "Dangerous Waste" and labels to identify major hazards.

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**Chemical Waste Disposal Request** -- A WHC form (Figure 4) used to provide sufficient information to the Site Hazardous Waste Engineering Support Unit to allow them to designate labelling, packaging, shipping and disposal requirements for waste.

**Oil and Hazardous Waste Analysis Request Form** -- A form (Figure 5) used to request analysis for used oil or waste of indeterminate integrity. The analysis is used to determine disposal requirements.

**Hazardous Waste Log Book** -- A log used to document receipt and shipment dates of hazardous waste, inspections of the storage facility and container specific identification numbers and waste description information. This log is maintained by the Hazardous Waste Coordinator.

**Satellite Accumulation Area** -- A designated location at or near any point of generation where small quantities of hazardous wastes are accumulated, under the control of the individual(s) of the process generating waste.

**Hazardous Waste Temporary Storage Area** -- A non-permitted maximum ninety (90) day storage area for hazardous waste. (Exception: Non-leaking Polychlorinated Biphenyl (PCB) items and liquids with concentrations <500 ppm can only be stored for thirty (30) days or less). Waste is shipped from the temporary storage area to a designated facility (i.e., 616 Facility (permitted), 212-P PCB Storage Facility). The Hazardous Waste Temporary Storage Area shall be under the control of the Hazardous Waste Coordinator.

**Accumulation Date** -- The date at which, 55 gallons dangerous waste or 1 quart of acutely hazardous waste is collected. For unknown waste, the accumulation date is the date when: 1) laboratory analysis is received, 2) constituents or hazards are identified, or 3) there is a reason to suspect a hazard. For PCB waste, the accumulation date is when the first item (i.e., light ballast, cleanup rag) is placed in a container.

Hazardous waste is transported to the Nonradioactive Dangerous Waste Storage Facility (616 Facility) within 90 days of the accumulation date. PCBs shall be transported to the Polychlorinated Biphenyl Storage Facility (212-P Facility) within 30 days of the accumulation date.

**Empty Container** -- A container or liner is considered empty if wastes have been removed using common practices such that the volume of remaining waste is the lowest of the following:

- The volume of waste remaining in the container or inner liner is equal to one percent or less of the total capacity of the container, or

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- If the total container capacity is over 110 gallons, the volume of remaining waste is no more than 0.3 percent of the total capacity.

A 55 gallon drum is considered empty if less than 1/4 inch of waste remains at the bottom.

A container which held compressed gas is considered empty when the pressure inside the container equals or nearly equals atmospheric pressure.

A container or inner liner which held acutely hazardous waste, or pesticides bearing a danger or warning label, is considered nonregulated if the container or inner liner has been triple rinsed with an appropriate cleaner or solvent. The volume of cleaner or solvent used for each rinse must amount to 10% or more of the container/inner liner capacity. Rinsate must be managed in the same manner as the product or designated as hazardous waste.

**Chemical Waste Disposal Analysis Letter** -- The document issued by the Site Hazardous Waste Engineering Support Unit in response to the Chemical Waste Disposal Request. The Analysis Letter provides instructions for packaging, shipping and storage of hazardous waste. The letter also provides information for completing the Uniform Hazardous Waste Manifest.

## **4.0 RESPONSIBILITIES**

### **4.1 FIELD TEAM LEADER**

The Field Team Leader is responsible for minimizing generation of hazardous waste whenever possible, controlling the process which generates waste, designating personnel responsible for handling hazardous waste, verifying training requirements, contacting the Hazardous Waste Coordinator for direction regarding accumulation, storage and disposal of hazardous waste and providing initial waste description information (i.e., Material Safety Data Sheets).

### **4.2 PERSONNEL DESIGNATED TO HANDLE HAZARDOUS WASTE**

Personnel designated to handle hazardous waste are responsible for identifying, packaging, preparing associated documentation and storing hazardous waste.

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**4.3 HAZARDOUS WASTE COORDINATOR**

The Hazardous Waste Coordinator is responsible for:

- Identifying or verifying composition of waste
- Obtaining a determination from the Hazardous Waste Unit regarding regulatory requirements, identification numbers and waste classifications
- Inspecting container and storage areas (i.e., containers are tightly capped, marked and labeled)
- Arranging for transport and disposal
- Tracking shipments
- Providing storage and disposal instructions that comply with the requirements of applicable regulation and company policy
- Maintaining the Hazardous Waste Log Book.

Hazardous Waste Coordinators are the only individuals authorized to sign the Uniform Hazardous Waste Manifest to relinquish WHC hazardous waste for shipment.

**4.4 RADIATION PROTECTION TECHNOLOGIST**

The Radiation Protection Technologist is responsible for monitoring for radiation hazards.

**4.5 SITE HAZARDOUS WASTE ENGINEERING SUPPORT UNIT**

The Site Hazardous Waste Engineering Support Unit is responsible for providing waste designations and waste disposal analysis, assisting in proper packaging, observing packaging on a random basis for dangerous waste and maintaining a record of onsite waste shipments and designations. The Unit will also assist to resolve any waste shipment discrepancies.

**5.0 REQUIREMENTS**

**5.1 REGULATIONS**

The following state and federal regulations are applicable to hazardous waste disposal activities and must be available to the Hazardous Waste Coordinator:

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- Washington Administrative Code (WAC), Chapter 173-303, "Dangerous Waste Regulations" (Washington State Department of Ecology).
- Title 40, Code of Federal Regulations, Parts 260-271, "Environmental Protection Agency Hazardous Waste Management Regulations."
- Title 49, Code of Federal Regulations, Parts 100-179, "Department of Transportation Regulations."

**5.2 RELEASE RESPONSE AND REPORTING**

Action should be taken immediately to clean up nonroutine releases of hazardous materials. The normal sequence of action is to STABILIZE the spill, WARN others, ISOLATE AND MINIMIZE IMPACT (SWIM).

When releases occur, clean up shall be performed by personnel trained for such work. If this support is not immediately available at the time of a release the Fire Department, the Environmental Protection Group and Industrial Safety and Fire Protection Group shall be contacted for support.

The Environmental Protection Group shall be notified within 4 hours of nonroutine releases/spills, regardless of quantity. An Event Fact Sheet shall be completed with 24 hours as required by the WHC Unusual Occurrence reporting system.

Information that must be available for reporting releases includes:

Chemical names

An estimate of quantity released

Time and duration of release

Medium into which released

Action taken to respond to and contain release

Health risk associated with release

Name and telephone number of contact person.

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### 5.3 SAFETY

The temporary storage facility shall be labelled at the entrance with signs legible from a distance of 25 feet reading, "Hazardous Waste Temporary Storage Area" and "Danger, Unauthorized Personnel Keep Out". Letters of the warning heading shall be at least 2 inches. Temporary storage areas shall also be marked with the H<sub>1</sub> PCB Label (Figure 6).

A sign shall also be posted to identify emergency response personnel. The posted sign shall include the names and phone numbers or radio call number of the Hazardous Waste Coordinator and two alternates, the Fire Department, and the Environmental Protection Group.

#### 5.3.1 Safety Equipment

The following safety equipment must be available in the temporary storage facility and be in good working order:

- Emergency communication system (e.g., Telephone or two-way-radio)
- Portable fire extinguishers
- Spill control equipment (e.g., absorbent, salvage drums)
- Protective clothing
- Respirators/cartridges (if needed)
- Eyewash station.

### 5.4 TRAINING

Training shall include the Hazardous Waste Site 40 Hour Vendor, WHC training course 100012. In addition, the Hazardous Waste Coordinator shall complete WHC training courses 2006S, Hazardous Waste Shipment Certification, and 2006G, Generator Hazardous Safety Training, annually.

### 5.5 FACILITY REQUIREMENTS

Any temporary storage facility containing hazardous waste constructed or installed after September 30, 1986 must have a containment system that shall comply with the following requirements:

- Have a base free of cracks or gaps and be sufficiently impervious to contain spills, leaks and rainfall.

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- Have positive drainage control to prevent release on contaminated and allow drainage of uncontaminated precipitation.
- Sufficient capacity to contain 10% of the volume of all containers or the volume of the largest container, whichever is greater, and precipitation of a maximum 25 year storm of 24 hour duration.

**5.5.1 Inspection**

1. Weekly inspections shall be performed at satellite and temporary storage areas (WAC 173-303-630 (6)) by the Hazardous Waste Coordinator or delegate to ensure that containers are closed, not damaged or leaking, properly identified and marked (i.e., advanced waste marking) and segregated, if containing incompatible waste. The inspection shall also include checks of safety, emergency and monitoring equipment and the containment system. Inspections shall be documented in the Hazardous Waste Log Book and shall include, as a minimum, the date and time of inspection, observations made, and any actions taken as a result of the inspection.

**5.6 CONTAINERS**

1. Containers holding hazardous waste shall be made of or lined with materials which will not react with and are otherwise compatible with the waste. 55 gallon drums are commonly used, however, many other types and sizes are available.
2. Small containers of hazardous waste of the same hazard class may be placed in overpack drums (or labpacks) provided the inside containers are non-leaking, tightly sealed, and waste compatible. The outer container must be per DOT specifications and no more than 110 gallon capacity. The outer container must be full after packing with containers and waste compatible absorbent. All enclosed wastes must be identified. Further restrictions are identified in the Chemical Waste Disposal Analysis Letter.
3. In addition, all containers used for hazardous waste must be in good condition (i.e. seals in place, clean), closed, except when waste is being added or removed, and be handled in a manner which prevents rupture or leaking.
4. For empty drums, if the definition of empty is met (see section 3.0, Empty Container), drums shall be capped tightly and marked with their former contents.

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**5.7 MARKING AND LABELING**

Advanced Waste Marking shall be clearly identified on container holding hazardous waste. Empty containers which previously contained hazardous waste must also be marked and labeled as if regulated.

**6.0 PROCEDURE**

**6.1 MINIMIZING HAZARDOUS WASTE**

The generation of hazardous waste shall be minimized whenever possible. Personnel may minimize hazardous waste generation by:

- Substituting non-hazardous materials for hazardous materials, if possible
- Ensuring that hazardous materials are not ordered in excessive amounts
- Limiting mixing of hazardous and non-hazardous wastes for disposal. When combined, these wastes must be handled as hazardous.

**6.2 CONTROL OF HAZARDOUS WASTES**

**6.2.1 Hazardous Waste Coordinator Notification**

The Field Team Leader shall contact the Hazardous Waste Coordinator for direction prior to initiating activities that will generate hazardous waste. The Field team leader shall provide the Hazardous Waste Coordinator with Material Safety Data Sheets (MSDS) or any other documentation providing information pertinent for waste characterization.

**6.2.2 Hazardous Waste Identification/Designation**

The Hazardous Waste Coordinator shall determine if waste should be treated as a hazardous waste.

- If the waste is identified by a brand name, the MSDS shall be checked to determine the chemical composition of the waste.
- If the waste is not identified on a MSDS, the Coordinator or team leader shall contact the Hanford Environmental Health Foundation (HEHF) to obtain the necessary information.



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- If information is not available through HEHF, the Coordinator or team leader shall contact the manufacturer for MSDS and information.

Copies of MSDS procured shall be sent to HEHF for their master file.

If the waste is of indeterminate integrity, used oil or unknown, the Coordinator shall initiate an Oil and Hazardous Waste Analysis Request Form (Figure 5).

The Hazardous Waste Coordinator will provide personnel with instructions to package, store and dispose of the waste in accordance with Department of Transportation Hazardous Material Regulations, Section 172, "Hazardous Materials Tables and Hazardous Material Communication Regulation." The Hazardous Waste Engineering Support Unit shall provide assistance as necessary.

**6.2.3 Accumulation in Satellite Area**

1. Hazardous waste generated at or near the point of generation shall be placed in a satellite accumulation area. The satellite accumulation area shall be under the control of the Field Team Leader or delegate and established as directed by the Hazardous Waste Coordinator.
2. All hazardous waste in the satellite accumulation area shall be managed to comply with sections, 5.1, 5.2., 5.3.1, 5.6 and 5.7 of this instruction.
3. Personnel designated to handle waste shall:
  - Handle and package waste
  - Apply Advance Waste Marking, if waste characteristics are known. The accumulation date shall be added when 55 gallons of dangerous waste or 1 quart of acutely dangerous waste is accumulated.

**Note:** If the contents of the container are oil or hazardous waste of questionable composition, the waste shall be sampled and analyzed. Use the Oil and Hazardous Waste Analysis Request Form to initiate analyses of waste.

- Keep containers securely closed at all times except when filling or emptying.

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4. Hazardous waste shall not be stored for more than 90 days of the accumulation start date. In addition, the satellite area shall not contain more than 55 gallons of dangerous waste or 1 quart of acutely dangerous waste.
5. The hazardous waste coordinator shall make arrangements for transporting waste to a temporary storage area that complies with section 5.3.

6.2.4 Temporary Storage Area

1. The Hazardous Waste Temporary Storage Area shall be under the control of the Hazardous Waste Coordinator or delegate. Waste shall not be placed in temporary storage area without the permission of the Hazardous Waste Coordinator or delegate.
2. Once hazardous waste is delivered to the temporary storage facility, the Hazardous Waste Coordinator or delegate shall:
  - Mark the side of each container with a sequential number based on the next available number in the log book
  - Enter a description for each container of waste to include accumulation date, waste name, amount of waste, size and type of drum, waste characteristics, and waste numbers, if known. If the waste description is not known at the time waste is delivered to the facility, it shall be entered into the log book as the information becomes available.

The manifest number and date waste is shipped out of the temporary storage area shall also be recorded in the log book.

3. The temporary storage area shall be managed to comply with section 5.0.

Exception: Unknown waste (see section 3.0, Accumulation Date)

4. Hazardous waste shall not be stored for more than 90 days of the accumulation start date. PCBs shall not be stored for more than 30 days of the accumulation start date.
5. The hazardous waste coordinator shall make arrangements for transporting waste to an appropriate storage facility (e.g. 616 Building, ect.).

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6.3 PREPARATION FOR DISPOSAL

1. The Hazardous Waste Coordinator shall ensure that containers are:

- Tightly closed with bung or cap
- Appropriately marked and labeled
- Not damaged or leaking
- Waste compatible.

2. The Hazardous Waste Coordinator or designated waste handlers shall prepare the Chemical Waste Disposal Request (Figure 4) and submit it along with any documentation substantiating the chemical composition of the waste (i.e., laboratory results and MSDSs) to the Site Hazardous Waste Engineering Support Unit.

3. The Site Hazardous Waste Engineering Support Unit shall acknowledge receipt of the Request (usually within 5 working days) and based on the information provided, determine identifying numbers, classification, and shipping name, required labels and markings, and packaging and shipping requirements. If receipt is not acknowledged in a timely manner, the status of the request should be investigated. This information is forwarded to the Hazardous Waste Coordinator in the Chemical Waste Disposal Analysis Letter.

4. The Hazardous Waste Coordinator shall notify the Site Hazardous Waste Engineering Support Unit if discrepancies exist within the Analysis Letter regarding regulatory requirements or information submitted in the disposal request. All questions shall be resolved prior to shipment of the waste.

5. Based on the Chemical Waste Disposal Analysis Letter, the Hazardous Waste Coordinator or designated waste handlers shall prepare the waste for shipment as specified in the letter and make arrangements to prepare the Uniform Hazardous Waste Manifest. The Chemical Waste Disposal Analysis Letter contains the necessary information to properly dispose of regulated and nonregulated waste from the facility.

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**Effective Date** March 15, 1989**NONRADIOACTIVE HAZARDOUS WASTE DISPOSAL****6.4 TRANSPORTATION TO DESIGNATED FACILITY**

1. The Hazardous Waste Coordinator shall obtain Traffic Department inspection of all containers. Approval shall be indicated by the initials of the Traffic Department representative on the Manifest.
2. The Hazardous Waste Coordinator shall arrange with a Transportation Representative for a transport date, and shall request a Radiation Protection Technologist survey prior to transport.
3. The Radiation Protection Technologist shall place an Unconditional Radiation Release Sticker on each container (Figure 7). The Release Sticker is valid for only 24 hours.
4. To document the initial transfer, the certified Hazardous Waste Coordinator relinquishing the shipment and the transporter accepting the shipment shall sign and date the Manifest (Figure 3). The Hazardous Waste Coordinator shall keep the copy marked "Generator". The original Manifest shall accompany the shipment. The Hazardous Waste Coordinator shall log each shipment in the Hazardous Waste Log Book.
5. At the receiving facility, the transporter and the facility representative shall sign the Manifest, keeping the copies marked "Transporter #1" and "TSD Facility." The original shall be sent to the Site Hazardous Waste Engineering Support Unit, where a copy is maintained. The original shall then be forwarded to the Hazardous Waste Coordinator.
6. If the original is not returned to the Hazardous Waste Coordinator within 35 days of the date the waste was accepted by the initial transporter, the transporter, the receiving facility and the Site Hazardous Waste Engineering Support Unit shall be contacted to determine the status of the shipment.
7. If the original signed Manifest is not returned to the Hazardous Waste Coordinator within 45 days of the date the waste was accepted by the initial transporter, an exception report shall be submitted to the Department of Ecology. The report shall include a legible copy of the Manifest in question, and a cover letter explaining the efforts made to locate the waste and the results of those efforts.

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**6.5 RECORDS**

The following records are generated by this procedure and shall be maintained for at least three years (WAC 173-303-210 and 380):

Uniform Hazardous Waste Manifest

Laboratory analysis

Material Safety Data Sheets

Hazardous Waste Log Book

Chemical Waste Disposal Analysis Letter.

Records generated by this procedure will be controlled per EII 1.6, "Records Managements."

**7.0 REFERENCES**

1. Title 40, Code of Federal Regulations, Parts 260-271, "Environmental Protection Agency Hazardous Waste Management Regulations."
2. Title 49, Code of Federal Regulations, Parts 100-179, "Department of Transportation Regulations."
3. Washington State Administrative Code, Chapter 173-303, "Dangerous Waste Regulations."
4. WHC-CM-7-7, EII 1.6 "Records Management."

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NONRADIOACTIVE HAZARDOUS WASTE DISPOSAL

# HAZARDOUS WASTE

STATE AND FEDERAL LAW  
PROHIBITS IMPROPER DISPOSAL

IF FOUND, CONTACT THE NEAREST POLICE, OR  
PUBLIC SAFETY AUTHORITY, AND THE  
WASHINGTON STATE DEPARTMENT OF ECOLOGY,  
OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY

PROPER D.O.T.

SHIPPING NAME \_\_\_\_\_ UN or NA# \_\_\_\_\_

GENERATOR INFORMATION:

NAME U.S. DEPARTMENT OF ENERGY

ADDRESS P.O. BOX 550, 2401 STEVENS DR.

CITY RICHLAND STATE WA ZIP 99352

EPA

ID NO. WA7890008967

EPA

WASTE NO. \_\_\_\_\_

ACCUMULATION

START DATE \_\_\_\_\_

MANIFEST

DOCUMENT NO. \_\_\_\_\_

## HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

STYLE WMSPEC-P

Figure 1. Hazardous Waste Label.

SECRET AUG 15 1989

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§ 172.419 FLAMMABLE LIQUID label. (a) Except for size and color, the FLAMMABLE LIQUID label must be as follows:



(b) In addition to complying with §172.407, the FLAMMABLE LIQUID label must be red. The symbol and inscription must be black or white. The solid line border and, if used, the hazard class number must be the color of the symbol.

§ 172.420 FLAMMABLE SOLID label. (a) Except for size and color, the FLAMMABLE SOLID label must be as follows:



(b) In addition to complying with §172.407, the FLAMMABLE SOLID label must be white with vertical red stripes equally spaced on each side of a red strip in the center of the label. The rectangle for the words "FLAMMABLE SOLID" must be white. The printing and symbol must be black with the symbol overprinted. The words "FLAMMABLE SOLID" must not contact any red stripe. The white stripes must be sufficiently wider than the red stripes to make them appear visually equal in width.

§ 172.429 OXIDIZER label. (a) Except for size and color, the OXIDIZER label must be as follows (see §172.405 for authorized label modification):



(b) In addition to complying with §172.407, the OXIDIZER label must be yellow. The printing and symbol must be black.

Figure 2. Hazard Class Labels. (Sheet 1 of 2)

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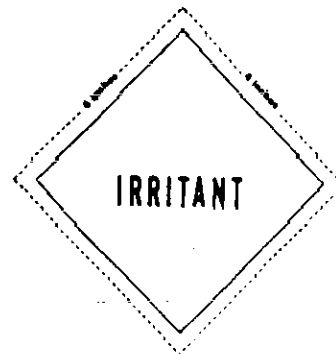
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§ 172.438 POISON label. (a) Except for size and color, the POISON label must be as follows (see § 172.405 for authorized label modification):



(b) In addition to complying with § 172.407, the POISON label must be white. The printing and symbol must be black.

§ 172.432 IRRITANT label. (a) Except for size and color, the IRRITANT label must be as follows:



(b) In addition to complying with § 172.407, the IRRITANT label must be white. The word "IRRITANT" must be red.

§ 172.443 CORROSIVE label. (a) Except for size and color, the CORROSIVE label must be as follows:



(b) In addition to complying with § 172.407, the CORROSIVE label must be white in the top half and black in the lower half. The printing must be white and the symbol must be black and white.

Figure 2. Hazard Class Labels. (Sheet 2 of 2)



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Please print or type. (Form designed for use on sites (12-inch) typewriter.) Form Approved OMB No. 2050-0038, Expires 9-30-88

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator's US EPA ID No.		Manifest Document No.		2. Page 1 of		Information in the shaded areas is not required by Federal law.					
3. Generator's Name and Mailing Address						A. State Manifest Document Number							
4. Generator's Phone ( )						B. State Generator's ID							
5. Transporter 1 Company Name				6. US EPA ID Number		C. State Transporter's ID							
7. Transporter 2 Company Name				8. US EPA ID Number		D. Transporter's Phone							
9. Designated Facility Name and Site Address				10. US EPA ID Number		E. State Transporter's ID							
						F. Transporter's Phone							
						G. State Facility's ID							
						H. Facility's Phone							
11. US DOT Description (including Proper Shipping Name, Hazard Class and ID Number)						12. Containers		13. Total Quantity		14. Unit Wt/Vol		15. Waste No.	
a.						No. Type							
b.													
c.													
d.													
J. Additional Descriptions for Materials Listed Above						K. Handling Codes for Wastes Listed Above							
15. Special Handling Instructions and Additional Information													
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the most feasible method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.													
Printed/Typed Name						Signature						Month Day Year	
17. Transporter 1 Acknowledgement of Receipt of Materials													
Printed/Typed Name						Signature						Month Day Year	
18. Transporter 2 Acknowledgement of Receipt of Materials													
Printed/Typed Name						Signature						Month Day Year	
19. Discrepancy Indication Space													
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.													
Printed/Typed Name						Signature						Month Day Year	

Style F18REV-8 Labelmaster, Div. of American Labelmark Co. 60846 (312) 478-0800 EPA Form 6700-22 (Rev. 3/88) Previous editions are obsolete.

ORIGINAL — RETURN TO GENERATOR

Figure 3. Uniform Hazardous Waste Manifest (EPA Form). (Sheet 1 of 5)

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Please print or type. (Form designed for use on 11 x 17 inch typewriter.)

Form Approved OMB No. 2080-0039 Expires 9-30-88

<b>UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)</b>		21. Generator's US EPA ID No.	Manifest Document No.		22. Page	Information in the shaded areas is not required by Federal law.	
23. Generator's Name		24. Transporter Company Name		25. US EPA ID Number	L. State Manifest Document Number		
					M. State Generator's ID		
26. Transporter Company Name		27. US EPA ID Number			N. State Transporter's ID		
					O. Transporter's Phone		
					P. State Transporter's ID		
					Q. Transporter's Phone		
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)				29. Containers	30. Total Quantity	31. Unit Wt/Vol	32. Waste No.
				No.	Type		
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							
i.							
j.							
k.							
l.							
33. Additional Descriptions for Materials Listed Above				34. Handling Codes for Wastes Listed Above			
35. Special Handling Instructions and Additional Information							
36. Transporter Acknowledgement of Receipt of Materials				Date			
Printed/Typed Name				Signature		Month Day Year	
37. Transporter Acknowledgement of Receipt of Materials				Date			
Printed/Typed Name				Signature		Month Day Year	
38. Discrepancy Indication Space							

Style F10-6 Labelmaster, Chicago, IL 60646

EPA Form 8700-02A (3-84)

ORIGINATOR-RETURN TO GENERATOR

Figure 3. Uniform Hazardous Waste Manifest. (Sheet 2 of 5)

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**ITEM 1:** Enter the Hanford EPA Identification Number, "WA 789 000 8967," and the unique manifest document number which is assigned by the Site Hazardous Waste Engineering Support Unit.

**ITEM 2:** Enter the total number of pages used to complete the manifest.

**ITEM 3:** Enter the generator's name and mailing address as identified in the Waste Disposal Analysis Letter.

**ITEM 4:** Enter the telephone number where authorized personnel may be reached in the event of an emergency as identified in the Waste Disposal Analysis Letter.

**ITEM 5:** Enter "Westinghouse Hanford Company" in this block.

**ITEM 6:** Enter the Hanford EPA Identification Number, "WA 789 000 8967."

**ITEM 7:** Leave this space blank.

**ITEM 8:** Leave this space blank.

**ITEM 9:** Enter the name and complete site address of the facility designated to receive the waste listed on the manifest.

**ITEM 10:** Enter the Hanford EPA Identification Number, "WA 789 000 8967."

**ITEM 11:** Enter the RQ or X applicable, DOT proper shipping name, hazard class, and identification number (UN/NA) for each waste, as identified in Waste Disposal Analysis letter.

**NOTE:** If additional space is needed for waste descriptions, enter the additional information in Block J or in Item 28 of the continuation sheet.

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**ITEM 12:** Enter the number of containers of each waste and the appropriate abbreviation from the list below for the type of container:

Metal drums, barrels, kegs.....DM  
Wooden drums, barrels, kegs.....DW  
Fiberboard or plastic drums, barrels, or  
Kegs.....DF  
Tanks, portable.....TP  
Cargo tanks (tank trucks).....TT  
Tank cars.....TC  
Dump truck.....DT  
Cylinders.....CY  
Metal boxes, cartons, cases.....CM  
Wooden boxes, cartons, cases.....CW  
Fiber or plastic boxes, cartons, cases....CF  
Burlap, cloth, paper, or plastic bags.....BA

**ITEM 13:** Enter the total quantity of waste in kilograms described on each line. Do not include the container (or any absorbent in a labpack).

**ITEM 14:** Enter the unit of measure in Kilograms (K).

**ITEM I:** Enter the applicable Ecology waste number(s) for the waste described on each line as identified in the Waste Disposal Analysis Letter.

**ITEM J:** For lines a, b, c, and d above, list number of containers, container size and DOT approved drum number.

**ITEM K:** The Traffic Department will sign in this space when the packages have been inspected.

**ITEM 15:** Use this space to indicate special transportation, treatment, storage cell designation, or disposal information, or additional waste package information.

**ITEM 16:** Read the certification statement, then sign and date the block.

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**ITEM 17:** The transporter must sign and date this block to acknowledge acceptance of the waste described in the manifest.

**ITEM 18:** Leave this space blank.

**ITEM 19:** The receiving facility operator must note in this space any significant discrepancies between the waste described on the manifest and the waste actually received at the facility. Significant discrepancies must be resolved within 15 days after the waste is received.

**ITEM 20:** The receiving facility operator signs and enters the date of receipt in this space to certify receipt of hazardous materials covered by the manifest.

**NOTE:** Corrosive liquids must not be shipped above or adjacent to oxidizers, flammable solids, or organic peroxides. Consequently, these items should be manifested separately unless Transportation can provide space or barriers between them in the truck.

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Complete unshaded parts and forward to: Hazardous Waste Unit EIS-55 Westinghouse		CHEMICAL WASTE DISPOSAL REQUEST				Manifest No.					
Requested By		Telephone No.	MSIN	Company		Disposal Analysis Distribution*					
Signature/Date		Accumulation Date	Generating Facility		1 Generator 4		2 H W U 5				
					3 6		* May be used by generator as needed				
WASTE DESCRIPTION (For additional items, continue on the back of this form)											
A Item No.	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	G Chemical Components	H Weight %	I Physical Properties	J Hazards	K Waste Status	L Container Status
Example 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% in Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH < 2 Flash point > 200 °F	C	O	I
Example 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PR
Example 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 < 1 ppm	Liquid, pH = 8.2 Flash Point > 200 °F	None	U	MT

**INSTRUCTIONS**

**Accumulation Date** - List the accumulation date of the oldest waste  
**Column A** - Item Number - Item number for each unique waste  
**Column B** - Number of Containers - Number of containers of a unique waste to be disposed  
**Column C** - Container Size - Size of containers specified in Column B. If multiple container sizes, specify number and size of each.  
**Column D** - Container Description - Specify container's DOT specification. If non-DOT container or unknown, specify type, e.g. steel drum.  
**Column E** - Total Waste Quantity - Total waste quantity (in kilograms only) of each unique waste to be disposed.  
**Column F** - Waste Description - Specify trade name or general description of each unique waste. If waste material is a paint, specify color for evaluation of pigments.  
**Column G** - Chemical Components - List all organic and inorganic components of the unique waste using specific chemical names. Attach Material Safety Data Sheets, analytical data, or other documents to adequately describe the composition of the waste.

**Column H** - Weight (%) - For each waste component indicate percent or range of percentage which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.  
**Column I** - Physical Properties - Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.  
**Column J** - Hazards - Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).  
**Column K** - Waste Status - Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Old (or expired) (O), Spill Material (S).  
**Column L** - Container Status - Indicate whether container is: Full (F), Partially Full (PF), Empty (< 1 in 55 Gal Drums) (MT), Triple Rinsed (TR).

Figure 4. Chemical Waste Disposal Request.

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## **NONRADIOACTIVE HAZARDOUS WASTE DISPOSAL**

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**HANFORD ENVIRONMENTAL  
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## OIL &amp; HAZARDOUS WASTE ANALYSIS REQUEST FORM

(Samples will not be accepted with out all necessary,  
properly completed paper work)

**REQUESTOR**

Name \_\_\_\_\_ Company \_\_\_\_\_  
Bldg/Area \_\_\_\_\_ Phone \_\_\_\_\_  
Work Order \_\_\_\_\_ MSIN \_\_\_\_\_

For Lab Use Only  
CO # \_\_\_\_\_  
Rec'd \_\_\_\_\_  
Log # \_\_\_\_\_

**SAMPLE CONTAINERS** - All oils and organic samples shall be submitted in glass containers with teflon-lined caps. Other samples shall be submitted in containers appropriate for the requested analyses. Consult HEHF lab (6-6980) for assistance in container selection and sample quantity requirements.

### SAMPLE DESCRIPTION

Sampling Location \_\_\_\_\_

Method of Sampling \_\_\_\_\_

\_\_\_\_\_ Glass tubing \_\_\_\_\_

\_\_\_\_\_ Coliwasa \_\_\_\_\_

\_\_\_\_\_ Other(describe) \_\_\_\_\_

Type of Container

55 gal. drum

## Transformer

## Hydraulic System

Other (describe)

Description of material sampled (Label information, transformer #, original use, drum #, suspected concentrations etc)

Is sample submitted representative  
of all phases present in container  
sampled?

Is a radiation survey needed?

If "yes": external only

: external & internal

(Copy of all survey data must be attached)

### CHAIN OF CUSTODY

Sampled by \_\_\_\_\_  
Date Sampled \_\_\_\_\_  
Date Relinquished \_\_\_\_\_

Received by \_\_\_\_\_  
Date Received \_\_\_\_\_  
Date Relinquished \_\_\_\_\_

Shipped by \_\_\_\_\_  
Date Received \_\_\_\_\_  
Date Relinquished \_\_\_\_\_

Received for Lab \_\_\_\_\_  
Date Received \_\_\_\_\_  
Storage Location \_\_\_\_\_

REQUESTED ANALYSES

\_\_\_ PCBs-Required Detection Limit: \_\_\_2 ppm \_\_\_1 ppm \_\_\_0.05 ppm \_\_\_Other  
 \_\_\_ Ignitability (Flash Point) \_\_\_ Oil Metals (As, Cd, Cr, Pb)  
 \_\_\_ Halogenated Hydrocarbons \_\_\_ Polynuclear Aromatics (PAHs)  
 \_\_\_ Corrosivity: \_\_\_pH \_\_\_Steel Corrosion \_\_\_ Anions (F, Cl, NO<sub>3</sub>, NO<sub>2</sub>, PO<sub>4</sub>, SO<sub>4</sub>)  
 \_\_\_ EP Toxicity: \_\_\_B Metals \_\_\_Pesticides \_\_\_ Basic cations (Na, K, NH<sub>3</sub>)  
 \_\_\_ Other Metals (list) \_\_\_ Glycols  
 \_\_\_ Solvent ID by GC/MS \_\_\_ Reactivity  
 \_\_\_ Other Analysis (Specify)

**REPORTING DEADLINE**

Does sample have 90 day clock running or other compliance deadline?

SEND REPORT TO

Name \_\_\_\_\_  
MSIN \_\_\_\_\_

RETURN SAMPLE TO

If yes, clock start date \_\_\_\_\_  
or compliance due date \_\_\_\_\_  
If no, desired due date \_\_\_\_\_

Name \_\_\_\_\_  
Bldg \_\_\_\_\_ Area \_\_\_\_\_

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~~Figure 5. Oil and Hazardous Waste Analysis Request Form (HEHF).~~

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NONRADIOACTIVE HAZARDOUS WASTE DISPOSAL

# CAUTION

## CONTAINS

# PCBs

(Polychlorinated Biphenyls)

A toxic environmental contaminant requiring special handling and disposal in accordance with U.S. Environmental Protection Agency Regulations 40 CFR 761 - For Disposal Information contact the nearest U.S. E.P.A. Office.

In case of accident or spill, call toll free the U.S. Coast Guard National Response Center:

800-424-8802

Hanford Patrol 811 or  
373-3800 Utility Dispatch  
373-2320 or 323-2321

Figure 6. M<sub>L</sub> PCB Label.



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**RADIATION RELEASE**

BLDG. \_\_\_\_\_ DATE \_\_\_\_\_

RELEASED BY \_\_\_\_\_  
RADIATION MONITORING

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

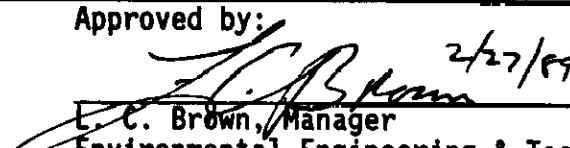
64-3000-022 (S - 87)

Figure 7. Unconditional Radiation Release Sticker.

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	Organization	Environmental Engineering and Technology
TITLE	Approved by:	
BIOTIC SAMPLING	 2/27/89	
	L. C. Brown, Manager	
	Environmental Engineering & Technology	

## 1.0 PURPOSE

The purpose of this Environmental Investigation Instruction (EII) is to present the methodology used during preparation of the Sampling and Analysis Plan to establish the requirements for site specific biotic sampling activities.

## 2.0 SCOPE

This EII applies to field activities performed by the Environmental Engineering and Technology (EE&T) Function of Westinghouse Hanford Company (WHC) or subcontractors performing the work where specified by a statement of work or WHC approved protocol. This instruction applies to site characterization activities on waste sites (hazardous and radiological) where biotic inventories and/or sampling may be necessary. Site-specific requirements will be provided in detailed Sampling and Analysis Plans.

This EII does not apply to routine pest control that is governed by a separate set of approved procedures.

## 3.0 DEFINITIONS

Biotic -- Pertaining to life or living organisms. For the purpose of this instruction biotic refers to plants and animals, living or dead.

Field Logbook -- Used to document biotic inventories or sampling activities per EII 1.5, "Field Logbooks." It is used for recording site activities, information specific to sampling, and other activities related to individual sampling sites.

## 4.0 RESPONSIBILITIES

### 4.1 FIELD TEAM LEADER

The Field Team Leader or his designate is responsible for:

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- Preparing and obtaining approval of the Sampling and Analysis Plan
- Directing field operations from mobilization to the sample site, to the completion of demobilization
- Ensuring required permits have been obtained
- Directing biotic field activities
- Delegating sampling responsibilities
- Ensuring maintenance and control of documents generated as a result of sampling activities.

**4.2 SAMPLING TEAM**

The sampling team is responsible for:

- Performing all sampling in accordance with the Sampling and Analysis Plan and as directed by the Field Team Leader
- Maintaining communications with the Field Team Leader as required by the Sampling and Analysis Plan
- Completing Field Logbooks as required
- Performing other field tasks as requested by the Field Team Leader.

**4.3 HEALTH AND SAFETY OFFICER**

The Health and Safety Officer is responsible for checking the adequacy of the Personal Protective Equipment (PPE) in accordance with the Health and Safety Plan. The Health and Safety Officer also works with the Field Team Leader to ensure that all safety precautions are being met with regard to any physical, mechanical, chemical, or radiological hazards.

**4.4 RADIATION PROTECTION**

A Radiation Protection Technologist will be required at sites designated as radiation zones.

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## **5.0 REQUIREMENTS**

### **5.1 SAFETY REQUIREMENTS**

All sampling activities shall comply with the site Health and Safety Plan requirements for access control, monitoring of radiation hazards and PPE.

### **5.2 RECORDS**

Records shall be maintained as required by EII 1.6, "Records Management."

### **5.3 TRAINING**

Personnel responsible for biotic sampling or reconnaissance activities shall be biologists qualified in accordance with EII 1.7, "Indoctrination, Training and Qualification." Other personnel may assist in biotic sampling activities under the supervision of qualified personnel.

Whenever possible all personnel involved in biotic sampling should attend workshops or society meetings (annual basis) that address biotic sampling activities.

## **6.0 PROCEDURE**

### **6.1 GENERAL**

The matrix provided in Appendix A summarizes the review processes and considerations that are part of the biotic sampling effort. Appendix A provides information and/or activities that are taken into consideration during preparation of the Sampling and Analysis Plan. Components 1 and 2 are required for every site. The other components may be applicable when sampling and analysis of biota are to be conducted. The Sampling and Analysis Plan will provide the details and methodologies for collecting these data.

## **7.0 REFERENCES**

1. WHC-CM-7-7, EII 1.5, "Field Logbooks."
2. WHC-CM-7-7, EII 1.6, "Records Management."
3. WHC-CM-7-7, EII 1.7, "Indoctrination, Training and Qualification."

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## BIOTIC SAMPLING

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## APPENDIX A

## BIOTIC SAMPLING MATRIX


### Biological Entities

Components	Mammals	Herptiles	Birds	Plants	Aquatics
1. Literature Search	+	+	+	+	+
. Compile Past History					
2. Site Visit(s) by Qualified Personnel	+	+	+	+	+
. Document/Compile List	*	*	*	*	*
. Threatened/Endangered	*	*	*	*	*
. State Sensitive	*	*	*	*	*
. Proposed Species	*	*	*	*	*
. Biocontamination	*	*	*	*	*
3. Permits in Place					
. Collection Permits	*	*	*	*	*
. Excavation Permits					
4. Collection Procedures	*	*	*	*	*
. Capture Means					
. Species Identification					
. Reference Methodologies					
. Sample Processing					
. Field Data Sheets					
. Voucher Collections					
5. Analytical Procedures	*	*	*	*	*
. Laboratory					
. Analysis					
6. Data Analysis	*	*	*	*	*

† = must be done for each Sample and Analysis Plan

- \* - should be considered for each Sample and Analysis Plan

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TITLE	Approved by:	
PREPARATION OF GROUNDWATER MONITORING WELL CONSTRUCTION SPECIFICATIONS	 2/27/89	
	L. C. Brown, Manager	
	Environmental Engineering & Technology	

## 1.0 PURPOSE

This instruction establishes the requirements for preparing groundwater monitoring well construction specifications in accordance with Westinghouse Hanford Company (WHC) Standard Engineering Practices.

## 2.0 SCOPE

This Environmental Investigation Instruction (EII) applies to preparation by the Environmental Engineering and Technology (EE&T) Function of specifications required for construction of groundwater monitoring wells on the Hanford Site.

## 3.0 DEFINITIONS

Ground Water Monitoring Well -- A well designed to obtain a representative ground water sample and/or to measure the water level elevation over a screened interval.

Ground Water Monitoring Well Construction Specifications -- Groundwater monitoring well construction specifications (hereafter specifications) are documents defining the technical requirements for the construction and performance of groundwater monitoring wells on the Hanford Site.

## 4.0 RESPONSIBILITIES

### 4.1 COGNIZANT MANAGER

The Cognizant Manager, Environmental Engineering and Technology Function, is responsible for:

- Assigning the Cognizant/Project Engineer (CPE)
- Identifying groundwater monitoring well requirements in design criteria documents
- Verifying assigned Impact Levels and ensuring that necessary reviews have been performed.

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Review and approval shall include the Manager (and Cognizant Engineer if applicable) of the Group within the EE&T Function responsible for producing the groundwater monitoring well requirements.

#### 4.2 COGNIZANT/PROJECT ENGINEER

Cognizant/Project Engineers are responsible for:

- Preparing the specifications based on existing designs
- Assigning Impact Level and obtaining approval signatures required based upon the Impact Level
- Documenting and obtaining approval of all changes in accordance with WHC Standard Engineering Practices requirements
- Determining distribution requirements
- Incorporating changes into amendments or revisions of the specifications.

#### 4.3 COGNIZANT QUALITY ASSURANCE ENGINEER

The cognizant Quality Assurance Engineer is responsible for reviewing and approving Impact Level 1, 2 and 3 design documents and assuring that quality requirements are incorporated.

#### 4.4 SAFETY ENGINEER

The Safety Engineer is responsible for review of the specifications to assure that WHC industrial safety requirements are addressed.

#### 4.5 ENGINEERING CONFIGURATION MANAGEMENT

Engineering Configuration Management is responsible for:

- Assigning and maintaining accountability of engineering specification numbers
- Releasing engineering specifications
- Entering configuration information into the database
- Forwarding specifications and changes thereto to Information Resource Management.



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#### 4.6 INFORMATION RESOURCE MANAGEMENT

**Information Resource Management is responsible for:**

- Entering document retrieval information in the applicable database
- ~~Reproducing, microfilming, distributing, filing, retaining, and retrieving approved and released engineering specifications.~~

## 5.0 REQUIREMENTS

## 5.1 GENERAL REQUIREMENTS

Specifications shall be prepared for construction of groundwater monitoring well structures. The specifications shall document requirements for design, performance, material, installation, testing, quality and acceptance for groundwater monitoring well structures. Specifications shall be multi-use.

## 5.2 DESIGN REQUIREMENTS

General design requirements for construction of groundwater monitoring wells are contained in applicable Functional Design Criteria Documents.

### 5.3 SPECIFICATION FORMAT

Format of multi-use specifications for construction of groundwater monitoring wells shall be appropriate for the intended use and conform to WHC Standard Engineering Practices. Specifications shall contain the following:

- An approved Specification Release Record (Figure 1)
- Title page
- Table of contents
- The written text.

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## 5.5 SPECIFICATION APPROVAL, RELEASE AND CHANGES

Approval, release and changes to multi-use Ground Water Monitoring Well Construction Specifications shall be according to WHC Standard Engineering Practices.

### 5.5.1 Approval of Specifications

Minimum signature approval requirements for specifications are the originator's immediate manager and the Cognizant Quality Assurance Engineer. The method of recording approval signatures shall be on the Specification Title Page (Figure 2) and on the accompanying Specification Release Record (SRR). Additional approval signatures, identified by the assigned Impact Level and project, program, department, or division are recorded on the SRR.

### 5.5.2 Release of Specifications

Approved Ground Water Monitoring Well Specifications shall be transmitted to Engineering Configuration Management for processing, release, and the entry of configuration control information into the database.

5.5.2.1 Release Stamp. Upon release of the specification, the original SRR shall be stamped with an Official Release by WHC Engineering Configuration Management.

5.5.2.2 Transmittal. The released specification shall be transmitted by Engineering Configuration Management to Information Resource Management for reproduction, distribution, microfilming, filing, retention, and retrieval.

### 5.5.3 Changes to Released Specifications

Changes to released specifications may be made by amendment or revision. All changes shall be listed in the "LIST OF REVISIONS" block of the specification title page (Figure 2).

5.5.3.1 Amendment/Revision. Changes to specifications may be made by amendment if less than 20 percent of the total pages are affected. Each amendment to a particular specification shall be sequentially numbered starting with "1".

There shall be no more than four outstanding amendments to any specification. The next change to be made to a specification that has four outstanding amendments shall be made by a revision to the specification. This revision shall incorporate the outstanding amendments and the required change.

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Amendments are initiated, handled, approved, and released in the same manner as a new specification.

Specification revisions shall be identified by an alpha beginning with the letter "A". All pages of the revised specification shall indicate the revision letter.

**5.5.3.2 Change Transmittal.** Changes to released specifications are transmitted to Engineering Configuration Management. Changes transmitted to Engineering Configuration Management shall consist of the following:

- An updated Specification Release Record
- A Specification Amendment Sheet plus Continuation Page if required (see Figure 3, sheets 1 and 2)
- Text changes

**5.5.3.3 Change Notation.** Information changed as a result of an amendment or revision shall be identified with a vertical line and the amendment or revision number noted in the left margin of the affected page, adjacent to the revised information. The identifying revision information shall not be removed unless superseded by a subsequent change.

## 5.6 SAFETY REQUIREMENTS

A safety engineer shall review and approve the specifications for compliance with WHC industrial safety requirements.

## 5.7 QUALITY ASSURANCE REQUIREMENTS

The specifications shall be reviewed and approved by the Cognizant Quality Assurance Engineer to assure compliance with applicable quality assurance requirements.

## 5.8 RECORDS

The record produced by this instruction is the released specification which is processed per section 5.5.2.2. A copy of the released specification shall be retained by EE&T in the project files in accordance with EII 1.6, "Records Management."

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**6.0 PROCEDURE**

**6.1 PREPARATION OF GROUND WATER MONITORING WELL SPECIFICATIONS**

**6.1.1 Personnel Assignment**

The Cognizant Manager assigns preparation and review of Ground Water Monitoring Well specifications to qualified personnel by Internal Memo with concurrence by other involved managers. The Internal Memo shall identify applicable criteria documents for ground water monitoring well design and requirements.

**6.1.2 Preparation of Draft Specifications**

The CPE prepares the draft specific groundwater monitoring well(s) construction specifications according to the requirements of this procedure. Coordination drafts shall have a Prereleased Draft Title Page, Figure 4.

**6.1.3 Review of Draft Specifications**

The CPE submits the draft specifications to the Cognizant Quality Assurance Engineer, Cognizant Safety Engineer and other reviewers (as specified in 5.5.1) for review. The reviewers review the specifications for conformance to criteria documents, quality assurance and safety requirements. They provide review comments on the coordination drafts and return to the Cognizant Manager.

The Cognizant Manager transmits comments to the CPE, tracks dispositioning of review comments, verifies assigned Impact Level and resolves dispositioning questions.

**6.1.4 Specification Approval, Release and Transmittal**

The CPE dispositions comments, obtains concurrence signatures on Figure 1 and transmits the specifications for release according to the requirements of section 5.5.2 of this EII.

**6.2 CHANGES TO SPECIFIC GROUND WATER MONITORING WELL SPECIFICATIONS**

The CPE processes changes to released specifications according to the requirements of section 5.5.3 of this EII.

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## 7.0 REFERENCE

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Figure 1. Specification Release Record.





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Prepared By	Company Name	Amendment No.
Description		Date
		Page 1 of _____
Classified <input type="checkbox"/> Unclassified <input type="checkbox"/>	<b>SPECIFICATION AMENDMENT</b>	Specification No. _____ Rev. Ltr. _____ Date _____
This amendment forms a part of and must be used in conjunction with the specification and any other outstanding amendments.		
Title		
Approval		
Text of Amendment		
Reasons and Remarks		
		Revising SRI No.

54500-121-0-001

Figure 3. Specification Amendment Sheet. (Sheet 1 of 2)

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SPECIFICATION AMENDMENT			
SPECIFICATION NO.	REVISION	AMENDMENT NUMBER	PAGE

Figure 3. Specification Amendment Continuation Page. (Sheet 2 of 2)

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Prepared By _____	_____ <div style="text-align: center; font-weight: bold; margin-top: 20px;">           SPECIFICATION PRERELEASED DRAFT         </div>	Number _____ Type _____ Date _____ Submittal Date _____ Rev. List _____ Page 1 of _____ Total Pages _____
REVIEW COPY		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">         Title _____          _____          _____          _____          _____          _____       </div> <div style="width: 45%;">         _____          _____          _____          _____          _____          _____       </div> </div>		
<p>This specification prereleased draft is submitted for your review to facilitate preparation of the coordinated recommendation for formal review. Comments may be written in this copy. Please coordinate questions and comments received on this draft with the undersigned by telephone or other expeditious means.</p>		
<p>Return this copy to: _____  <small>Name Location Phone</small></p>		
<p>On or Before _____</p>		
<p>Reviewed By _____ Date _____</p>		

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Figure 4. Preleased Draft Title Page.

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## APPENDIX A

### DRILLING SPECIFICATION

#### 1.0 SCOPE

These specifications provide general requirements for drilling Ground-Water Monitoring Wells at RCRA Sites on the Hanford Reservation. The scope includes drilling the boreholes, collecting the sediment samples, setting up and removing the aquifer testing equipment, completing the final monitoring structure, and hydraulically developing the permanently screened interval. An Excavation Permit, and a Data Sheet listing the locations of the proposed wells, the coordinates, well numbers, casing size and schedule, and approximate well depths will be required for each well.

#### 2.0 REFERENCED CODES, STANDARDS AND SPECIFICATIONS

The standards and specifications listed below form a part of this specification to the extent indicated by subsequent references.

##### 2.1 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A53 - Welded and Seamless Steel Pipe  
Type E or S, Grade B Sch 40

ASTM A312 - Seamless and Welded Austenitic Stainless Steel Pipe

ASTM A778 - Schedule 5 or 10 304 Stainless Casing, with Sch 40 Flush Joint threaded couplings

##### 2.2 AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME Code, Section II Part C - Welding Rods, Electrodes, and Filler Metals

ASME Code, Section IX - Welding and Brazing Requirements

##### 2.3 AMERICAN WELDING SOCIETY (AWS)

AWS A2.0 - Standard Welding Symbols

AWS A3.0 - Terms and Definitions

AWS D1.1 - Structural Welding Code

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## **2.4 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)**

ANSI Z53.1 - Safety Color Code for Marking Physical Hazards

## **2.5 WASHINGTON ADMINISTRATIVE CODE (WAC)**

WAC 173-160 - Minimum Standards for Construction and Maintenance of Wells.

WAC 173-162 - Regulations and Licensing of Contractors/Operators.

## **2.6 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)**

29 CFR 1910-120 (O) Hazardous Waste Operations and Emergency Response

## **3.0 DAILY DRILLING LOG**

### **3.1 LOG INFORMATION**

The contractor shall maintain a continuous, chronological drilling log for each well on furnished drilling log forms. The minimum information to be recorded shall be as follows:

A. Date, well number, contract number, driller's name

B. The depth from the ground surface, thickness, general particle size distribution, general character (color sorting etc.), and drilling characteristics (hard to drill, flows into well, etc.) of each lithology encountered.

C. The depth and thickness of each moist zone encountered.

D. The direction of air circulation, if any, into or out of the hole.

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- E. The time work starts and stops each day, and hours spent at each type of work.
- F. Time and duration of all shutdown and standby periods, with the reasons therefore.
- G. Record of all difficulties encountered during drilling operations.
- H. Depth at which each sample is taken.
- I. Method of drilling used, core barrel (CB), hard tool (H), air rotary, mud rotary, etc.
- J. Type, size and amount of casing added, including depth to bottom of casing within 0.2 feet.
- K. Depth, type, and amount of drilling aid (water, bentonite, etc., if approved) used.

**3.2 METHOD OF KEEPING THE DRILLER'S LOG**

The log shall be kept complete, legible and accurate with entries made in sequence so that each can be correlated with the depth of the hole at the time. It shall be completed, at a minimum, at the end of each drilling day and shall be available upon call at any time during the day. If directed to standby or shutdown, an order shall be noted on the driller's original record. A complete, legible copy of the log signed by the driller shall be available to PNL and WHC daily if requested.

**3.3 RECORDS REQUIRED BY WAC 173-160**

The contractor shall complete and submit the Resource Protection Well Record required by WAC 173-160-050 to the Washington Department of Ecology (Ecology) on the required form, which will be provided by Westinghouse Hanford Company (WHC). WHC shall review the Resource Protection Well Record prior to submittal to Ecology by the contractor.

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## **4.0 MATERIALS**

### **4.1 TEMPORARY DRIVE CASINGS, TELESCOPING SCREENS AND DRILLING SHOES**

The well drive casing (temporary casing) shall be steel pipe conforming to ASTM A53, Type E or S, Grade B, Sch 40. The minimum diameter of temporary casing will be specified for each individual well. Drilling shoes shall be forged steel shoes of the common trade type. Drive casing and drive shoes shall be steam cleaned prior to initial use and between well sites.

Well screens shall be telescoping stainless steel as specified for the specific wells. The screens shall be continuous wire wrap construction, Johnson Division type 304 stainless steel monitoring screen or equal. Slot size and lengths shall be as specified. Well screens shall also be provided with a stainless steel flat bottom plate.

### **4.2 FINAL WELL MATERIALS**

#### **4.2.1 Approved Materials**

All well casings, screens, and other metal items which are a part of the final monitoring well must be constructed of the same material. The approved materials include Stainless Steel type 304, 316, 304L or 316L, or as specified.

#### **4.2.2 Cleaning and Packaging of Final Well Materials**

All well screens, casings, bottom caps and other metal items used to construct the final well, or that remain in the borehole, shall have been cleaned to remove all oils, greases, solvents, glues and waxes. The cleaning procedure used by the manufacturer shall be submitted to and approved by the project engineer before use of the material.

To minimize damage to the casings and screen, and contamination of the factory cleaned items, the following are required:

- All male threads should be protected from damage.
- All casing and screen must be individually wrapped and sealed in plastic packaging or better by the manufacturer. Contractor must provide manufacturer's specifications prior to installation.

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- Casings and screens must be shipped from the factory in boxes that will protect the items in transit and can be used to store the items until use. The boxes must be designed and constructed so they can be opened and inspected without damage to the enclosed items and still permit use as a temporary storage container. Each box must be clearly marked as to the items contained and similar sized items should be packed together.

#### 4.2.3 Final Well Screens and Bottom Caps

Well screens shall be flush joint threaded couplings with Viton O-ring seals or equal, and shall be compatible with the casing couplings, or by use with an adaptor. The screen for well completions will be continuous wire wrap construction, Johnson Division Stainless Steel monitoring screen or equal. (Well site geologist will select screen slot size). A bottom cap shall also be provided, Johnson Division Stainless Steel, bottom cap part number 6600247 or equal.

#### 4.2.4 Final Well Casing and Caps

Well casings shall be flush joint threaded couplings with Viton O-ring seals or equal, meeting ASTM Specification A312 or A778, double entry stub, ACME flush screw threaded with an O-ring on the male end fitting. Temporary caps for protecting the 2 inch and 4 inch casing shall be Schedule 40 PVC slip caps. Final caps for the 6 inch stainless steel caps shall be Johnson 304 locking monitoring, part # 11727 or equal and be at least 15 inches in length.

#### 4.2.5 Final Well Centering Guides

Centering Guides or Centralizers shall be of the same type of stainless steel as the well casings. Centralizers welded to the casing at the factory are preferred. Bolt on centralizers can be attached in the field. Welding of stainless steel centralizers to the stainless steel casing in the field is prohibited. A centralizer should be placed every 40 feet on the casing starting just above the screen, and every 20 feet on the screen.

#### 4.2.6 Filter Pack

Primary filter pack and secondary filter material shall consist of kiln dried, uniform, rounded and spherical grains of sand composed of at least 95 quartz. The filter pack shall have a uniformity coefficient (the quotient of the 60% passing, D60 size, divided by the 10% passing, D10 size) between 1.0 and 2.5. At least 90% of the particles shall have a Powers roundness of 4 to 6 (i.e., sub-rounded to well rounded). The secondary filter pack shall consist of two different sieve sizes of sand including: 20 to 40 mesh

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(commonly called 100 mesh) (effective particle size of 0.14 to 0.17 mm or 0.0055 to 0.0066 in.) (The well site geologist will select sand mesh size). The sand materials shall be packaged in sacks with polyethylene liners to prevent contamination and water damage. Each sack must be clearly labeled as to the mesh size of the sand contained. Approved supply sources are Colorado Silica Sand, Inc., Colorado Springs, Colorado and the Fountain Sand and Gravel Company, Pueblo, Colorado.

#### 4.2.7 Secondary Seal

The secondary seal shall consist of either bentonite pellets or a secondary filter consisting of 90% quartz sand. Bentonite pellets shall be nominal 0.25 in. diameter round or cylindrical pellets consisting of untreated sodium bentonite, packaged in plastic buckets or plastic lined sacks. Each sack or bucket shall be clearly labeled as to the pellet size. The dry bulk density shall be at least 80 lbs/ft<sup>3</sup>. A secondary filter "seal" consisting of well graded sand (i.e., normal distribution with 100% passing the No. 30 sieve, and less than 2% by weight passing the 200 sieve) shall be used in deep wells with more than 20 ft of water above the top of the filter pack. (Well site geologist will select sand mesh size).

#### 4.2.8 Bentonite Annular Seal Materials

Bentonite Grout. Bentonite grout shall be made from a sodium bentonite powder and/or granules for use below the water table. Potable water from an approved source shall be mixed with these powders or granules to form a thick bentonite slurry, with a Marsh Funnel viscosity of at least 100 sec./quart. Bentonite grout shall be mixed and used according to manufacturer's specifications and recommendations.

Bentonite Slurry. Bentonite slurry seals shall be a mixture of 1/3 lb 8-mesh bentonite and 2/3 lb 200 mesh bentonite in 1 gallon of water. A minimal amount of time shall be spent mixing the slurry to ensure a portion of the bentonite will remain unhydrated while being pumped in the annulus.

Granular Bentonite. Granular bentonite shall be coarse granular sodium bentonite crumbles, 8-20 mesh, labelled and packaged in sacks.

#### 4.2.9 Cement Grout and Concrete Surface Pads

Concrete used within 20 feet of the surface shall be an Air-entrained type to prevent freeze/thaw cracking of the surface seal and pad.

Cement grout, if used for the annular sealant, should be an expanding or non-shrinking type. At a minimum an additive can be added to standard portland cement at the site. This will consist of a mixture of portland

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cement (ASTM C-150) and water in the proportion of 5 to 6 gallons of clean water per bag (94 lbs or 1 ft<sup>3</sup>) of cement. Because of volumetric shrinkage, an additive should be added to the cement to cause it to expand on setting. Approved additives are either aluminum powder (1% by volume) or gypsum (3 to 6% by volume).

#### 4.2.10 Surface Well Protection

The final monitoring well shall be protected from damage by the following method:

- A 4-ft by 4-ft by 6-in concrete pad will be installed around the well. The concrete shall have an air entraining agent added to prevent freeze/thaw cracking of the pad. The concrete placed in the pad shall extend no more than 3.5 ft nor less than 2.5 ft down the borehole to the top of the annular seal.
- Four metal posts shall be installed around the casing. The guard posts shall be at least 3-in diameter, set in concrete. One metal post shall be set in 5-in diameter schedule 40 carbon steel pipe, set from ground level to 2.5 ft below the ground. The guard posts shall be at least 6-ft long and extend no more than 3-1/2 ft above the surface of the pad, (WAC 173-160-500). The posts shall be primed and painted yellow as defined in ANSI Z53.1, Safety Color Code for marking physical hazards. Primer and paint materials will conform to the following federal specifications.

Primer for metal parts	TT-P-645
Finish enamel	TT-E-489F, Class A

- A stainless steel casing of the same type as used for the casing and screen shall be placed around the final well casing. The locking caps for the protective steel casing shall be Johnson, part # 11727 stainless steel, monitoring locking cap, 15 inches in height, designed to slip over the permanent stainless steel casing without wobbling and to provide adequate vertical clearance for any type of dedicated sampling pump hardware.
- A brass survey marker shall be installed in the surface pad, one foot from the well.

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**5.0 CONSTRUCTING THE WELLS**

**5.1 GENERAL**

It is anticipated that the holes will be drilled in unconsolidated clays, silts, sands, gravels, and boulders, and semi-consolidated materials which may consist of hard cemented layers containing the materials described above.

**5.2 METHOD OF DRILLING**

The wells shall be drilled utilizing a method capable of obtaining split-spoon or equivalent type samples, if the need arises. It is anticipated that a temporary casing will be required to maintain an open borehole during drilling activities and the specifications are written with that in mind. The wells shall be drilled according to these specifications and shall conform to the State of Washington standards, "Minimum Standards for Construction and Maintenance of Wells", Washington Administrative Code (WAC) Chapter 173-160.

**5.3 SPECIAL INSTRUCTION FOR CONSTRUCTION OF WELLS AND AQUIFER TESTING SUPPORT**

Schematic diagrams of completed wells are provided. Figure Att-1 shows a well completed at the water table ("shallow well") and Figure Att-2 shows a well completed above a confining unit ("deep well"). Section 5.3.1 covers the instructions for completion of a shallow well and Section 5.3.2 covers the instructions for completion of a deep well. The sequence of work is written to specify that screens, artificial filter packs and seals are placed in specific locations. These locations may be changed upon the direction of the cognizant engineer or geologist. The final wells must be constructed such that borehole integrity is maintained at all times, in other words, the borehole wall does not collapse, which would compromise the construction of the well.

**5.3.1 Special Instructions and Sequence of Work for a Shallow Well**

A diagram of the well is shown in Figure Att-1. The well shall be constructed in the following manner.

A. Make hole and install surface starter casing.  
(Diameter as specified)

B. Make hole and install temporary casing, (diameter as specified).  
Installation of temporary casing must be accomplished so that all temporary casing can be removed as the well is completed.

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C. Make hole until the water table is encountered as determined by the geologist. Make additional hole below the water table as required or as determined by the geologist.

D. If an aquifer test is planned, install 20-ft of telescoping well screen and backpull the temporary well casing to expose the screen. Develop the well to the satisfaction of the on-site geologist. Install pump, power source, and discharge line. After completion of the aquifer test, disconnect the power source and remove the pump and discharge equipment, and store such equipment so as to prevent damage to it.

After the aquifer test has been completed, the telescoping screen shall remain in place and the permanent screen, casing and annular material will be installed inside the 8 inch telescoping screen.

E. Install 20 feet of screen with bottom cap and sufficient casing such that the top of the casing is 6 inches to 1 foot above the concrete pad. Wear cotton or latex gloves while handling screen. The bottom cap shall rest on the bottom of the borehole and be located approximately 15 feet below the water table. Centralizers shall be located every 40 feet on the casing starting just above the screen and every 20 feet on the screen.

F. Install filter pack sand in the annulus between the final well screen and temporary casing at least 3 feet above the top of the final well screen. Potable water from an approved source may be used to assist in placing sand. Check level of filter pack occasionally to ensure no bridging occurs.

G. Install a secondary seal consisting of a layer of bentonite pellets on top of the filter pack. The layer shall be between 3 and 5 feet thick. A minimum of 2 feet of secondary seal and filter pack must be maintained in the annulus during placement; the temporary casing should never be pulled above the level of the secondary seal in this step.

H. Install the annular seal from the top of the secondary seal to 20 + feet from the ground surface. The preferred annular seal is granular bentonite but bentonite pellets or bentonite slurry may be used instead. Bentonite pellets or crumbles can be dropped into the annulus slowly. If bentonite pellets or granules are used, the top of the seal should be measured every five feet to ensure that bridging does not occur. A bentonite slurry can be made by mixing granular bentonite and potable water from an approved source. The bentonite

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slurry shall have a thick, batter-like consistency with a Marsh Funnel viscosity of at least 100 seconds. It is recommended that no more than 20 feet of annular seal be added inside the temporary casing before the casing is pulled back. A minimum of 2 feet of materials must be maintained in the annulus during placement; the temporary casing should never be pulled above the level of the annular seal in this step.

- I. Install air-entrained Portland cement from the top of the annular seal to 3 feet below ground surface while backpulling the starter casing out of the ground.
- J. Form and place a 4-foot by 4-foot by 6-inch thick concrete pad using air-entrained cement. Allowance must be made for possible shrinkage of concrete in the borehole. The surface shall be sloped away from the well for drainage. The 6 inch stainless steel casing will be installed in the pad at this point, the top of the 6 inch casing shall be 2 1/2 feet above the top of the 4 inch casing and shall be positioned off center in relation to the 4 inch casing.

Install brass marker in apron flush with cement and stamp with well identification number (WIN) on the inner and outer well casing. (WAC 173-160-500).

- K. Develop well by surging and bailing until water is clear to the satisfaction of the geologist. Notice shall be given to the geologist at least 4 hours before beginning well development.
- L. Place four guard posts around the casing. One metal post shall be set in 5 inch diameter schedule 40 carbon steel pipe, set from ground level to 2.5 feet below the ground. Posts shall have been primed and painted with yellow paint.

**5.3.2 Special Instructions and Sequence of Work for a Deep Well**

A diagram of the well is shown in Figure Att-2. The well shall be constructed in the following manner.

- A. Make hole and install surface starter casing. (Diameter as specified)
- B. Make hole and install intermediate size casing, (Diameter as specified). Installation of temporary casing must be accomplished so that all temporary casing can be removed as the well is completed.

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- C. Make hole until the completion depth is reached as determined by the geologist.
- D. Install 20 feet of screen with bottom cap and sufficient casing sufficient such that the top of the casing is 1 foot to 1 1/2 ft. above the concrete pad. Wear new, clean cotton or latex gloves while handling screen. The bottom cap shall be resting on the bottom of the borehole as directed by the geologist. Centralizers shall be located every 40 feet on the casing starting just above the screen.
- E. Install 3-feet of filter pack sand in the annulus between the well screen and temporary casing. Pull temporary casing back 2-feet. Check level of filter pack and add additional filter pack alternately while backpulling temporary casing every two to three feet until the level of the filter pack is at least 3-feet above the top of the screen. A minimum of 2 feet of material must be maintained in the annulus during placement of the filter pack; the temporary casing should never be pulled above the level of the filter pack in this step. (If a bentonite slurry is to be used, a 1 ft. thick secondary filter shall be placed above the filter pack. The secondary filter material should be in a single step and allowed to fall through at least 10 ft. of water in the annulus to allow for proper segregation and placement).
- F. Install bentonite grout in the annular space to the water table while backpulling the temporary casing.
- G. Install the annular seal from the top of the secondary seal to 20 +/- 2 feet from the ground surface. The preferred annular seal is granular bentonite but bentonite pellets or bentonite slurry may be used. Details and guidance on installation of the annular seal are provided in Section 5.3.1 and need not be repeated here.
- H. Install air-entrained cement-grout from the top of the annular seal to 2 feet below ground surface while backpulling the starter casing out of the ground.
- I. Form and pour a 4-foot by 4-foot by 6-inch thick concrete pad using air entrained cement. Allowance must be made for possible shrinkage of cement-grout mix in the borehole. The surface shall be sloped away from the well for drainage. The 6 inch stainless steel casing will be installed at this point. The top of the 6 inch casing shall be 2-1/2 feet above the top of the 4 inch casing and shall be positioned off center in relation to the 4

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inch casing. Install brass marker in apron flush with cement and stamp with well identification number (WIN) on the inner and outer well casing. (WAC 173-160-500).

J. Develop well by surging, bailing or pumping until water is clear to the satisfaction of the geologist. Notice shall be given to the geologist at least 4 hours before beginning well development.

K. Place four guard posts in concrete, around the casing. One metal post shall be set in 5 inch diameter schedule 40 carbon steel pipe, set from ground level to 2.5 feet below the ground. Posts shall have been primed and painted with yellow paint.

## 6.0 SAMPLING OF EARTH MATERIALS PENETRATED AND OF WATER ENCOUNTERED

### 6.1 GENERAL

The contractor shall collect and provide to the geologist representative samples of the earth materials penetrated.

### 6.2 PROCEDURE FOR SAMPLING

Sample of the sediments penetrated shall normally be obtained at 5 foot intervals starting from the ground surface, and at each change in lithology. Samples representative of the material being penetrated shall be taken and placed in a five gallon bucket and upon the specific direction of the geologist. The "depth of the sample" is defined as the depth of the bottom of the driven core barrel or bailer.

#### 6.2.1 Sampling Frequency

Samples shall be taken at 5 foot intervals starting from ground surface and when directed by the site geologist.

#### 6.2.2 Special Sampling

The site geologist or other authorized personnel may request split-spoon samples be collected. Water samples shall also be collected once the water table is encountered. If perched water is encountered, the contractor shall cease drilling and notify the site geologist and Kaiser Engineers Hanford Company (KEH) personnel. Drilling shall not proceed until directed by the site geologist and KEH.

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## 7.0 PRECAUTIONS AGAINST CONTAMINATION

## 7.1 - GENERAL

--- The drilling contractor shall steam clean all drilling equipment (drill tools, cables before use and between well sites to prevent cross contamination of wells. Foreign materials from the land surface shall not be allowed to fall into the hole being drilled. At all times during the progress of the work, the well shall be protected in such a manner as to prevent either tampering with the well or the entrance of foreign matter into it.

## 7.2 DRILLING AIDS (Mudding Agents, etc.)

The use of drilling aids such as bentonite, other clay-based agents, water, or any foreign matter capable of affecting the characteristics of the sediment samples or ground water shall not be placed in the well without prior approval of the cognizant engineer or geologist. The driller will use only Chevron Poly FM (or equivalent and approved) food grade grease in making up drill strings/.

### 7.3 HANDLING AND STORAGE OF MATERIALS

The Contractor shall use all means necessary to protect permanent well construction materials before, during and after installation. All materials shall be kept off the ground on pallets, stands, racks, or sawhorses. All materials shall be stored in their original containers until needed for construction.

## 8.0 CASING AND TESTING HOLES

## 8.1 GENERAL

The well casing and well screen shall be steam-cleaned and rinsed using no detergents to ensure that all oils, greases, solvents, and waxes have been removed. The casing shall be driven progressively with the drilling of the hole and shall extend from the full depth of the hole drilled to the land surface. It is recommended that the hole should not be advanced more than 5 feet ahead of the casing and that the casing should not be driven more than 2 feet ahead of the hole.



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## 8.2 PIPE FABRICATION

The welding operations performed under this specification shall meet the minimum requirements for welding qualifications, butt joint welding and rod compatibility on carbon steel pipe as defined in ASME codes or AWS codes (as referenced in paragraphs 2.2 and 2.3).

## 8.3 STRAIGHTNESS TEST

To be acceptable under this specification, the well must meet the following test for straightness. The well shall be tested upon request of the geologist every 50 ft. for straightness and interior smoothness by the bailer, or any other device, having a minimum length of 20 ft. and minimum continuous diameter not more than 1-inch smaller than the specified inside continuous diameter of the well casing. The testing device shall be lowered into the hole to the bottom of the hole and must descend freely of its own weight and then be withdrawn without binding. The test for straightness shall be made in the presence of the geologist.

## 8.4 WELL ABANDONMENT

In the event the Contractor's well does not pass the straightness test and Contractor is unable to pull back the casing, the KEH representative may direct that the well shall be abandoned at the Contractor's expense, or that an alternative to completing the well be developed by KEH and/or WHC. The alternative shall be approved by WHC prior to performance. (If the well is abandoned, all material must be removed from the well if possible, and the well backfilled to the surface with bentonite grout.)

## 9.0 WELL AVAILABILITY

When requested by the geologist, the well shall be made clear of all tools to permit measurements or sample collection. When drilling or construction is not ongoing, the well shall be covered to prevent tampering.

## 10.0 WELL DEPTH

The final depth of the wells will be directed by the authorized field representative. During the drilling operation the cognizant engineer or geologist may change the actual required depth of the well depending upon the geological conditions encountered.

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**11.0 SITE CLEANUP**

All lumber, scrap materials, and other debris shall be removed from the site upon completion of the well. Uncontaminated excavation spoils shall be spread at the site to blend in with the normal surface elevations.

**12.0 QUALITY ASSURANCE**

**12.1 GENERAL**

The construction and material specifications set forth in this document are to be followed by the drilling contractor. KEH is expected to monitor and supervise the drilling activities in such a manner as to ensure that the wells are being constructed according to these specifications. Certain construction and material specifications are critical for the successful completion of these ground water wells to meet the requirements of the Resource Conservation and Recovery Act (RCRA). Documentation of conformance with these specifications will be requested by an inspection plan. Inspection and verification of Impact Level II items shall meet the applicable NQA-1 requirements as indicated with the PNL approved Quality Assurance Programs. Deviations from any specifications shall be brought to the attention of the construction engineer and cognizant engineer or geologist.

**12.2 INSPECTION VERIFICATIONS**

Material specifications shall be checked and documented by inspecting the materials listed in this section in the field and verifying that the materials specified are being used for the construction of these wells.

- A. Stainless steel screens, casings, centralizers, bottom cap, top cap, and locking cap.
- B. Carbon steel casing supplied by the drilling contractor.
- C. Filter pack material.
- D. Secondary seal materials.
- E. Granular bentonite and bentonite grout.
- F. Cement grout.
- G. Air-entrained Concrete.

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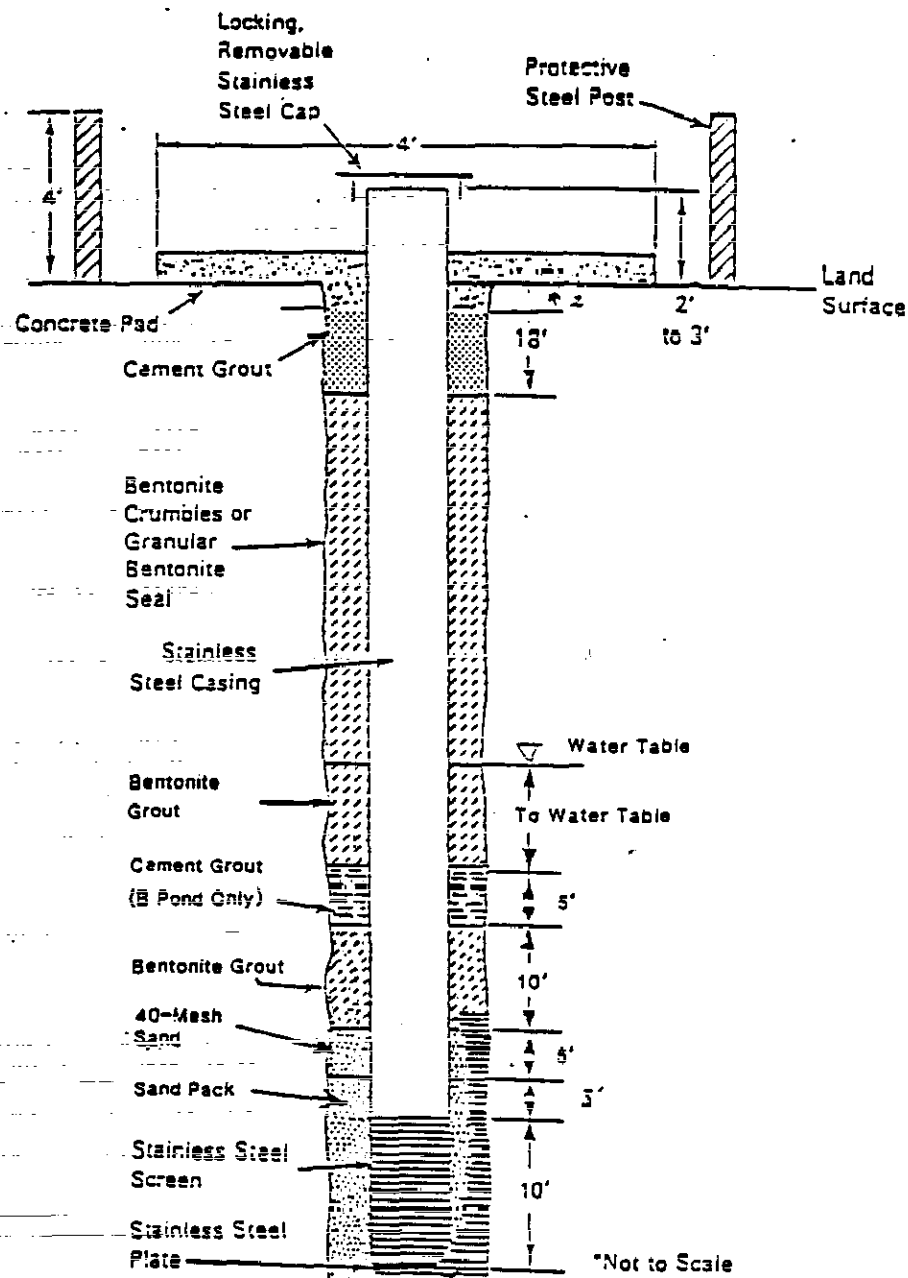
**12.3 SUBMITTALS**

The following shall be submitted to WHC.

- A. Inspection Plan. The plan shall include the method of verifying materials listed in paragraph 12.2, Pre-Award Submittal Review Items, Procurement items, and Well Drilling Activity items.
- B. Current Washington State drillers licenses for the contractor and for each of his employees who will be drilling the wells. These licenses shall be submitted prior to start of work.
- C. Resumes of each driller. Each driller shall have a total of 5 years experience, and shall have had experience drilling RCRA ground-water monitoring wells. Resumes shall be submitted prior to start of work.
- D. Washington State Department of Ecology well completion report as specified in paragraph 3.3.
- E. Cleaning procedures specified in paragraph 4.2.2.
- F. PNL Quality Assurance program addressing the following NQA-1 requirements for approval:

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**Figure A-1. Schematic Diagram of Completion of Deep Wells.**

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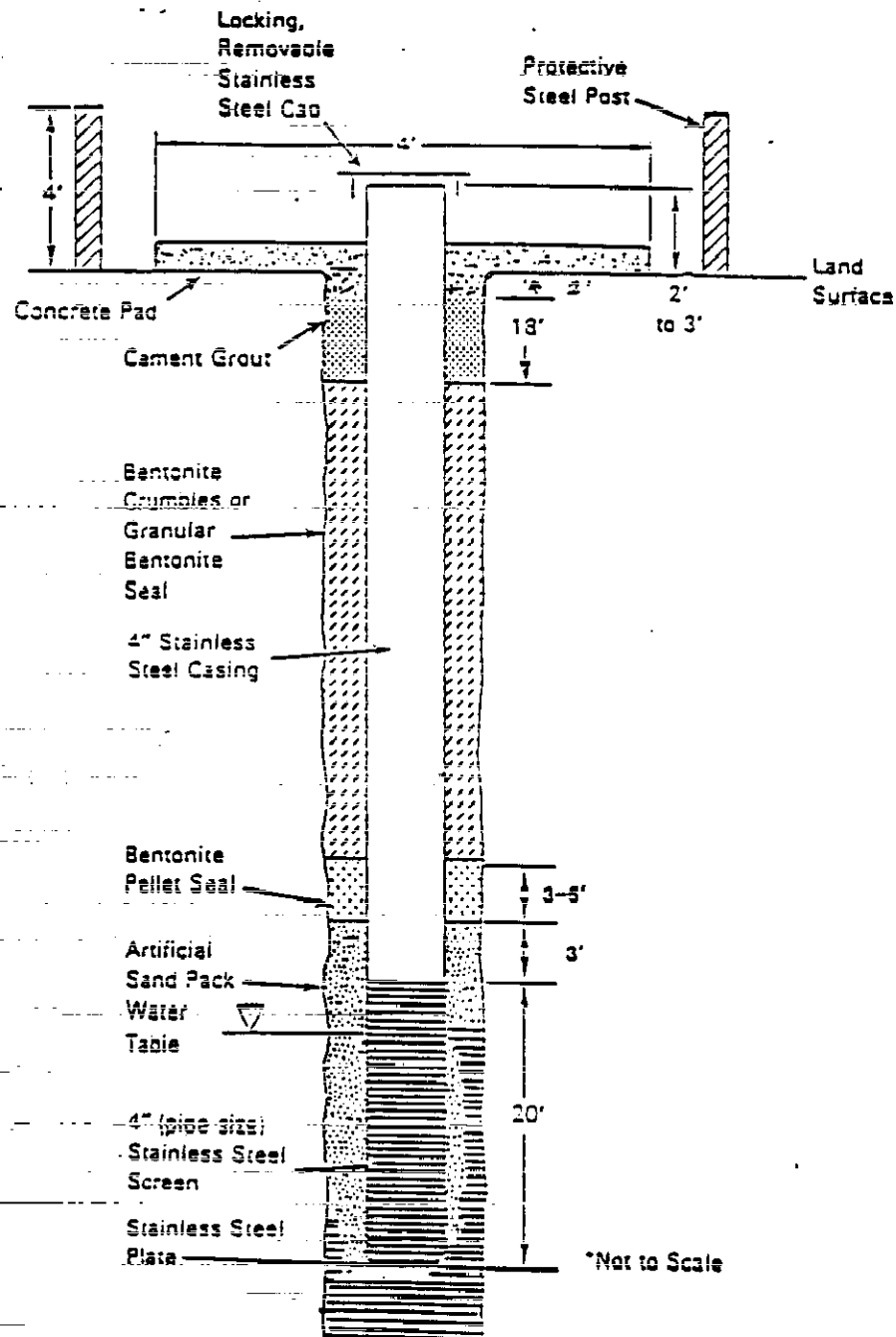


Figure A-2. Schematic Diagram of Completion of Shallow Wells.

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SITE CHARACTERIZATION MANUAL

Effective Date

August 15, 1989

Organization Environmental Division,  
Environmental Engineering and Technology

TITLE

Approved by

MEASUREMENT OF GROUND-WATER  
LEVELS

*L. C. Brown* 8/9/89  
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## 1.0 PURPOSE

This instruction establishes methods for performing and documenting measurements of ground-water levels in monitoring wells.

## 2.0 SCOPE

This instruction applies to measurements of ground-water levels in wells for routine water level monitoring and for aquifer testing as performed by the Environmental Engineering and Technology Function of Westinghouse Hanford Company (WHC).

## 3.0 DEFINITIONS

**Reference Point.** A fixed, clearly defined mark on the top of the well casing. The reference mark shall be surveyed to the National Geodetic Survey Vertical Control, 1929 and to the State Plane Coordinate Reference System (Washington South Zone) for horizontal control.

**Measurement Point.** A fixed, clearly defined mark from which the depth-to-water in a well is measured. The measurement point is located at the well head on a well seal, pump plate, etc., depending on the appurtenances installed in the well. In some cases the measurement point will be the same as the reference point.

**Weighted Measuring Tape.** A steel tape with graduations readable to the nearest 0.01 foot. A small weight of inert material is attached to the end of the tape to ensure that the tape is plumb and to permit detection of obstructions when lowered into a well.

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**Electric Sounder.** A water level measuring device that uses a light or gauge to show that end of the line has entered the water. The water in the well completes an electric circuit that, in turn, turns on the light or shows deflection on gauge. The line is graduated to show the depth. The electric sounder cannot be used where hydrocarbon products are present.

**Consistent Reading or Measurement.** Readings shall be considered consistent if they are:

- o Within +/- 0.02 feet (6mm) when taken with a weighted measuring tape
- o Within +/- 0.04 feet (12mm) when taken with an electrical water level measuring device.

**Continuous Water-Level Recording Device.** Used to record changes in water level over a continuous period of time during an aquifer test. They generally consist of a downhole float and balance, a recording chart drum, and a clock-driven pen. Certain types of devices use a downhole pressure transducer which converts water pressure to an electronic signal; such signals are continuously timed and stored on memory pending transferral to magnetic disks. Depending on the capabilities of the equipment, water levels may be recorded in terms of pressure or may automatically be converted to depth.

**Routine Water-Level Monitoring.** The measurement of water levels used for determining the elevation of the ground water in selected wells in, or in the vicinity of, operating areas for use in preparing water table, potentiometric or piezometric surface maps, or well hydrographs.

#### 4.0 RESPONSIBILITIES

##### 4.1 COGNIZANT ENGINEER'S MANAGER

The cognizant engineer's manager is responsible for providing overall technical control for making water level measurements of the water table of the unconfined aquifer and the potentiometric surface(s) of the confined aquifer(s).

##### 4.2 COGNIZANT ENGINEER

The Cognizant Engineer is responsible for directing all ground-water level measurement activities.



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**4.3 FIELD TECHNICIAN**

The field technician is responsible for performing routine ground-water level measurements as directed by the cognizant engineer.

**4.4 HEALTH AND SAFETY OFFICER**

The Health and Safety officer is responsible for monitoring health and safety hazards as required by the applicable health and safety plans for hazardous waste site characterization activities.

**4.5 RADIATION PROTECTION TECHNOLOGIST**

The radiation protection technologist (RPT) is responsible for radiological monitoring as required for work in radiation zones.

**5.0 REQUIREMENTS****5.1 SAFETY REQUIREMENTS**

All ground-water level measurement activities shall be in accordance with internal WHC industrial safety requirements during routine activities or the site Health and Safety Plan when ground-water level measurements are performed during hazardous waste site investigations and characterizations.

**5.2 RECORDS**

All ground-water level measurements taken as part of a routine monitoring program or for an aquifer test shall be recorded on the Ground-Water Measurement form, Figure 1. Ground-water measurements will be taken and recorded in feet. All decontamination activities shall be recorded on the Ground-Water Measurement form.

Recording charts from continuous recorders shall be identified with the well number, the date and time period of record, the device type and serial number, and the names of the persons installing and removing the chart. The chart must also show the water level as measured by a steel tape when the continuous recorder is installed and again when removed from the recording device. Charts shall be signed by the field technician and maintained as project records.

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For continuous recorders with memory systems, data shall be transferred to a magnetic disk. The disk shall be printed and identified as required for charts. The disk and hard copy shall be maintained as project records.

All records shall be processed in accordance with EII 1.6, "Records Management."

## 6.0 PROCEDURE

Water level measurements are made for routine water level monitoring and during aquifer tests that are conducted to determine the hydrologic properties of aquifers.

### 6.1 PRELIMINARY REQUIREMENTS

#### 6.1.1 Tape Calibration

At least one steel tape used for ground-water level measurements shall be calibrated in accordance with manufacturer's instructions and WHC calibration program standards. Calibrated tapes should only be used to standardize other tapes. Equipment shall have a valid calibration sticker affixed in a visible location, and any equipment whose calibration has expired shall be returned to the Standards Laboratory. The cognizant engineer is responsible for establishing the accuracy to which the equipment is to be calibrated. Equipment shall be calibrated to the accuracy required for use.

#### 6.1.2 Tape Standardization

All steel measuring tapes and E-tapes used for making a series of routine measurements or for aquifer testing shall be compared to the calibrated tape every six months and a sticker shall be affixed to the tape noting the date of standardization and the name of the person(s) performing the standardization. Documentation of standardization shall be made in a field logbook for tape standardization. Comparison shall be made by affixing weights with the same characteristics (i.e., weight and volume) to both the calibrated tape and the tape(s) to be standardized. The depth-to-water will then be measured in a deep well with both tapes. The measurement will be repeated three times for each tape to determine the average depth-to-water readings. For each routine depth-to-water measurement a correction will be calculated as follows:

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(Difference between calibrated and standardized tapes in calibration well) x (measured depth-to-water in routine well) / (depth-to-water in calibration well).

## 6.1.3 Decontamination

All measuring devices shall be decontaminated before each series of measurements and after each well measurement to ensure the safety of personnel and/or to prevent cross-contamination of wells. Measuring devices will be decontaminated with deionized water as a minimum level of decontamination, or as directed by the RPT. Other potential decontamination agents are non-phosphate detergent, methanol, and hexane. The levels of anticipated decontamination will be established using data obtained from the Hanford Ground-Water Data Base. An entry will be made on the Ground-Water Measurement form indicating that decontamination was performed and the method used.

## 6.1.4 Reference Point

A reference point shall be established at the top of the well casing. The reference point shall be measured to the nearest 0.02 ft and shall be clearly and permanently marked. It shall be surveyed to establish the elevation with reference to the National Survey, Vertical Control, 1929 in use at the Hanford Site. The elevation of the reference point will be recorded on the Ground-Water Measurement form, Figure 1.

## 6.1.5 Measurement Point

A measurement point shall be established near the top of the well head: on a well seal, pump plate, or similar device, and depth-to-water measurements will be made from this point.

## 6.2 GROUND-WATER LEVEL MEASUREMENT METHODS

## 6.2.1 Weighted Measuring Tape

The weighted steel measuring tape is the most accurate method for taking ground-water level measurements. The weighted tape is used as follows (all references to a form pertain to the Ground-Water Measurement form, Figure 1):

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1. Determine the difference between the reference point (RP) and measurement point (MP) using a carpenter's level and 1 ft steel scale, or using measured dimensions of the well appurtenances (well seal, pump plate, etc.). Record the difference in the "(MP-RP)" column of the form.
2. Chalk the lower one foot segment of the tape that extends below the zero point of the tape by drawing it across carpenter's chalk.
3. Lower the tape into the well until the water surface is penetrated and a marked increment on the tape coincides with the MP.
4. Record the tape reading at the measurement point in the column "Reading @ MP."
5. Withdraw the tape and record the reading at the demarcation between the dry and wetted portions of the tape. This reading indicates the length of the remaining dry portion of the chalked portion. Record the reading on the form under the column headed "Tape Demarcation."
6. Add the length of the dry portion of the chalked portion (step 5) to the tape reading at the measurement point (step 4). This quantity is the depth from the measurement point to the ground-water level, and is recorded in the column identified as "Depth-to-Water" on the form.
7. Correct the depth-to-water reading for standardization by apportioning the standardization correction based on the depth-to-water of the calibration well and the measuring well, as presented in Section 6.1.2. This correction is recorded in the column marked "Standardization Correction" on the form.
8. Compute the elevation of the water table or potentiometric surface by subtracting the measured depth-to-water (step 6), corrected for standardization (step 7), from the sum of the elevation of the reference point and the difference between the RP and MP (step 1). This may be expressed in a formula as follows:

elevation of water table or potentiometric surface =

$$[(\text{elevation RP}) + (\text{MP} - \text{RP})] - [(\text{measured D/W}) + (\text{std. correction})]$$

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The elevation of the water table or potentiometric surface is entered in the column marked "Elev. GW" on the form.

9. A minimum of two consistent measurements shall be taken to ensure the adequacy and accuracy of the measurement when performing routine ground-water level monitoring.

### 6.2.2 Electric Sounder

The use of the electric sounder follows the steps in Section 6.2.1, with the exception that steps 1 through 4 below replace steps 2 through 6 in Section 6.2.1:

1. Check the operation of the equipment by inserting the probe or contact ends in water to ensure that contact is clearly indicated on the meter.
2. Lower the probe or exposed contact ends of the tape into the well.
3. When the meter registers contact with water, record the tape graduation reading at the measurement point. This reading is the depth from the measurement point to the water level.
4. A minimum of two consecutive, consistent measurements shall be taken to ensure the adequacy and accuracy of the measurement when performing routine ground-water level monitoring.

### 6.2.3 Continuous Recording Device

The continuous recording device is used to record changes in the water level over a continuous period of time. The continuous recording device is used as follows:

1. Check operation of the equipment in accordance with manufacturer's instructions.
2. For float-balance type devices set the float in accordance with the manufacturer's instructions. The float should be of a diameter large enough to minimize friction between the float cable and the well walls. For pressure-transducer type devices, set the transducer as required by the manufacturer's instructions.
3. Fit the recorder with a locking weatherproof casing, to protect the equipment from damage and weather.

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4. Set the recorder in accordance with the manufacturer's instructions and secure the protective casing.
5. Check the recorder periodically to ensure that a malfunction has not occurred. Operational checks shall occur, as a minimum, each time the recording chart is changed, or as recommended by the cognizant engineer. Checks shall include a comparison of the recorded depth with a measurement made with a weighted, steel tape to ensure accuracy. The measured depth shall be recorded on the recorder chart along with the date and time of measurement, and the name of the person making the measurement; each chart then will have, as a minimum, a check noted when the chart is emplaced and when it is removed. The measured depth will also be recorded on the Ground-Water Measurement form.

## 6.3 DOCUMENTATION

1. Decontamination activities shall be recorded on the Ground-Water Measurement form, Figure 1.
2. The measurement device used, identified by type and serial number, and each individual ground-water measurement shall be recorded on the Ground-Water Measurement form, Figure 1. Each entry shall be initialed.
3. Recording charts, magnetic disks, and hard copies of the data from continuous recording devices shall be identified with the well number, date and time of chart emplacement and removal, and the device type and serial number. Charts, hard copies and magnetic disks shall be processed according to EII 1.6.

## 7.0 REFERENCE

WHC-CM-7-7, Environmental Investigations and Site Characterization Manual,

EII 1.6, "Records Management."

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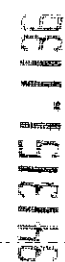
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Figure 1. Ground-Water Measurement Form.

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